WIPAIRE, INC.

WIPLINE FLOATS • SKIS • MODIFICATIONS • AIRCRAFT SALES
AVIONICS • INTERIOR • MAINTENANCE • PAINT REFINISHING

SERVICE MANUAL
and
INSTRUCTIONS FOR
CONTINUED AIRWORTHINESS
for the
WIPAIRE MODEL 8750
AMPHIBIOUS/SEAPLANE FLOAT
ON THE
CESSNA MODEL 208/208B CARAVAN

Revision B

P/N 1005723 Doc. No. W8750-24-01

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LOG OF REVISIONS

REVISION	PAGES AFFECTED	DESCRIPTION	DATE	FAA ACCEPTANCE
IR	ALL	INITIAL RELEASE	7/3/12	
A	See List	Add green grease as an approved grease.	4/18/2013	
B	See List	Added 208B eligibility, updated Hydraulic powerpack image	6/28/2013	
C	See List	Updated Fig1-8 for new oleo, updated photo p25, changes to MLG rigging procedure, update to inspection procedures, defined water rudder rigging procedures, remaining pages repaginated, removed p107	5/30/2014	
D	See List	Added Shear Torque chart, PR 1440 C Sealant, Tef-Gel and full contact info. Removed Warranty Claim Form. Corrected 1200 was 1000, 1400 was 1150 and 1900 was 1300	5/26/2015	
E	See List	Added Dow Corning DC4 and Mobil Aviation Grease SHC 100 to approved product list	7/9/2015	

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23	C	59	C	95	C
24	IR	60	C	96	C
25	IR	61	C	97	B
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27	IR	63	C	99	B
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NEW CUSTOMER INFORMATION

Customer Name	
Billing Address	
Shipping Address	
Phone Number	**Fax Number**
Purchasing Contact	**Phone Number**
E-Mail	**Fax Number**
Accounts Payable Contact	**Phone Number**
E-Mail	**Fax Number**
Type(s) of Aircraft Owned or Maintained	
Model(s) of Floats and Skis Owned or Maintained	
FedEx and/or UPS account number (if applicable)	

Please return to Wipaire Customer Service:

Fax 651-306-0666 Phone 651-306-0459 CustomerService@wipaire.com

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CHAPTER 1
INTRODUCTION AND GENERAL INFORMATION

1.0 INTRODUCTION

This manual is provided for the owners of Wipaire model 8750 Floats as installed on the Cessna 208 Caravan and 208B Grand Caravan. It has two main priorities:

To inform owners of the level and amount of servicing required to properly maintain their floatplane, and to provide technical data and servicing as specified to maintenance professionals charged with servicing the floats.

The service products referred to throughout this manual are described by their trade names and may be purchased from the Wipaire Parts Department.

We, at Wipaire, welcome your purchase and look forward to years of satisfying exchanges with you. Your floats are built with pride and attention to detail, but we want that care to extend beyond your purchase. Our customer service department is available for your questions 24 hours a day, 7 days a week, where ever you are in the world.

Parts Sales and Technical Support Dept:

Wipaire, Inc.
1700 Henry Avenue – Fleming Field
South St. Paul, MN 55075
Telephone: (651) 306-0459
Fax: (651)-306-0666
Website: www.wipaire.com
Email: CustomerService@wipaire.com

In this service manual we have worked hard to include many repair scenarios in addition to the recommended products, practices, and routine maintenance required to keep your floats in working order.

When a float part is significantly changed or an additional inspection is recommended or required, often a service letter and/or kit is issued. If a warranty is issued, most commonly it is for an 18 month time period, so it is crucial to check for service letters specific to your float model at each periodic inspection to be eligible.

Service Manuals and the installation prints included are also revised periodically and also to be kept updated. Service letters, Service Kits and Service Manuals are available on our web site at no charge, www.wipaire.com.

NOTE:

IT IS CRITICAL TO CHECK FOR MANUAL UPDATES EACH TIME AN INSPECTION IS EXECUTED.

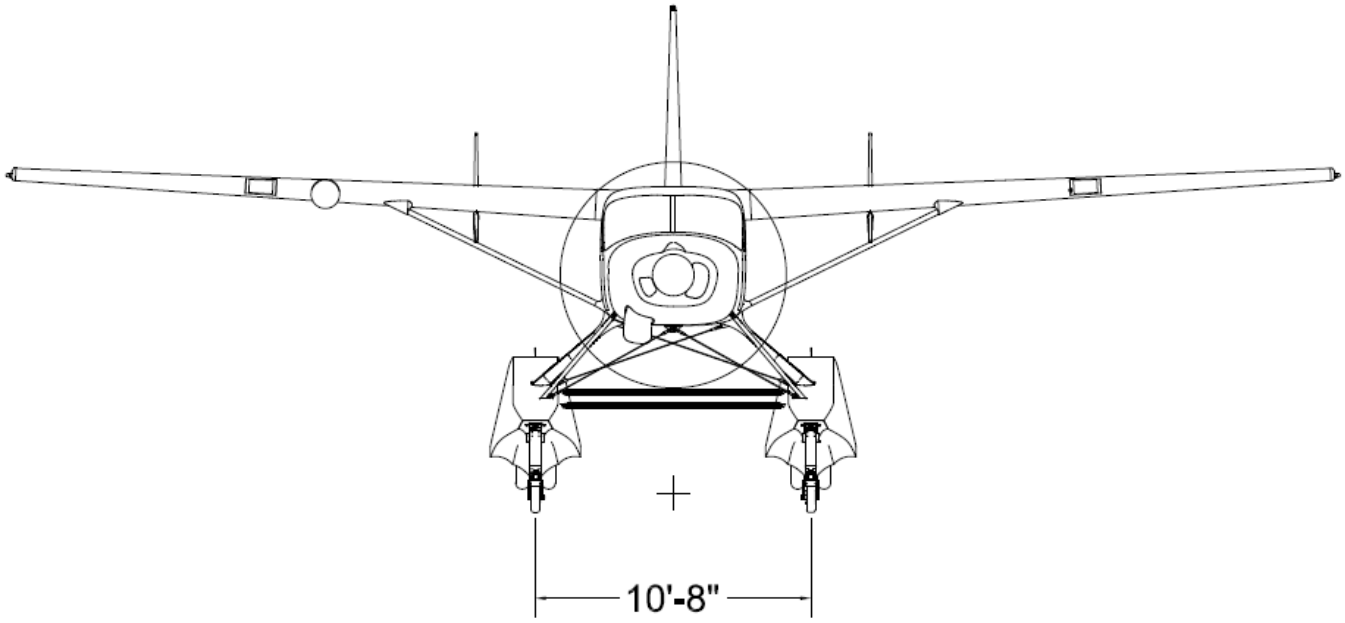


FIGURE 1-1: FRONT VIEW
CESSNA 208 CARAVAN

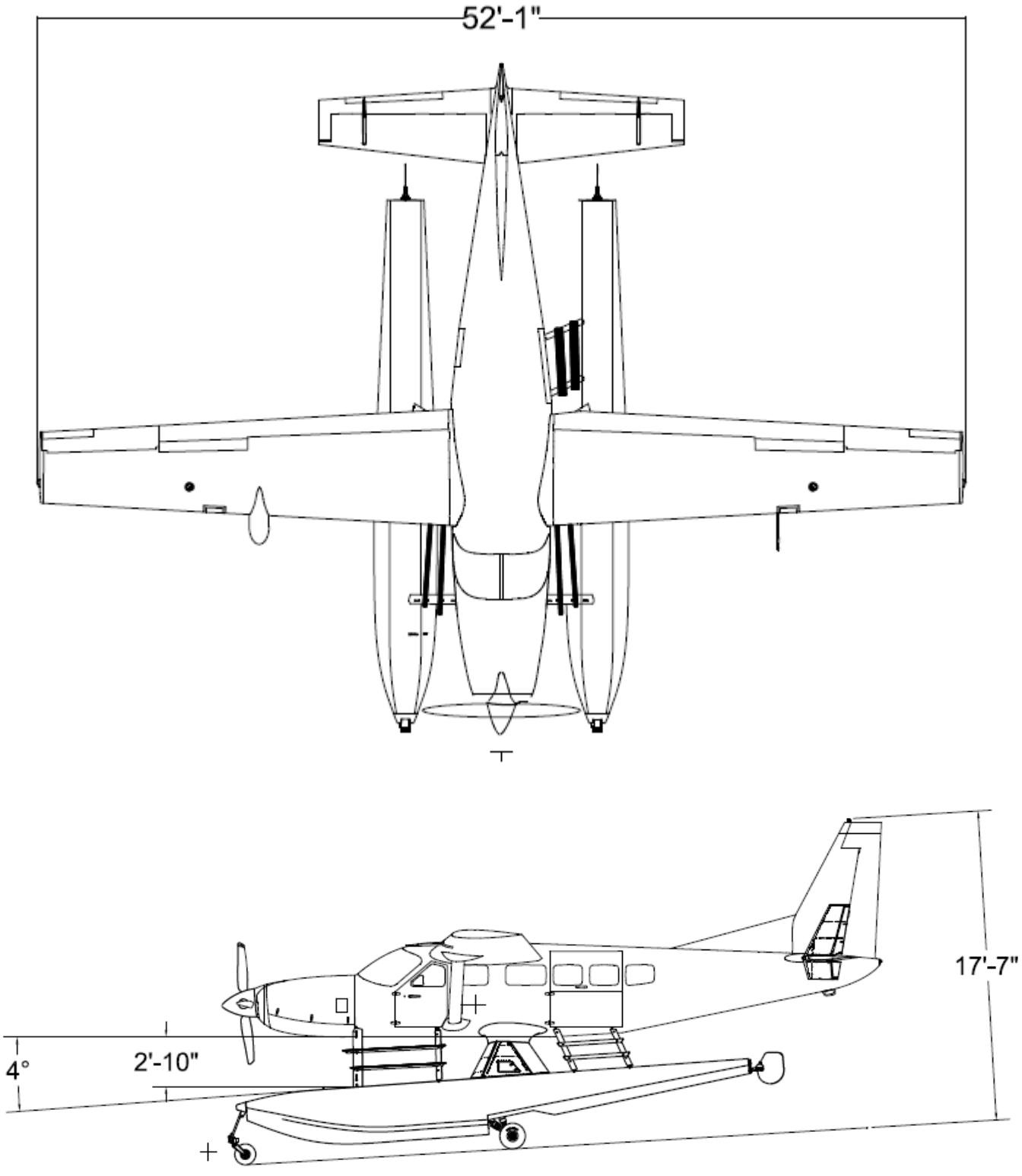


FIGURE 1-2: TOP & SIDE VIEWS
CESSNA 208 CARAVAN

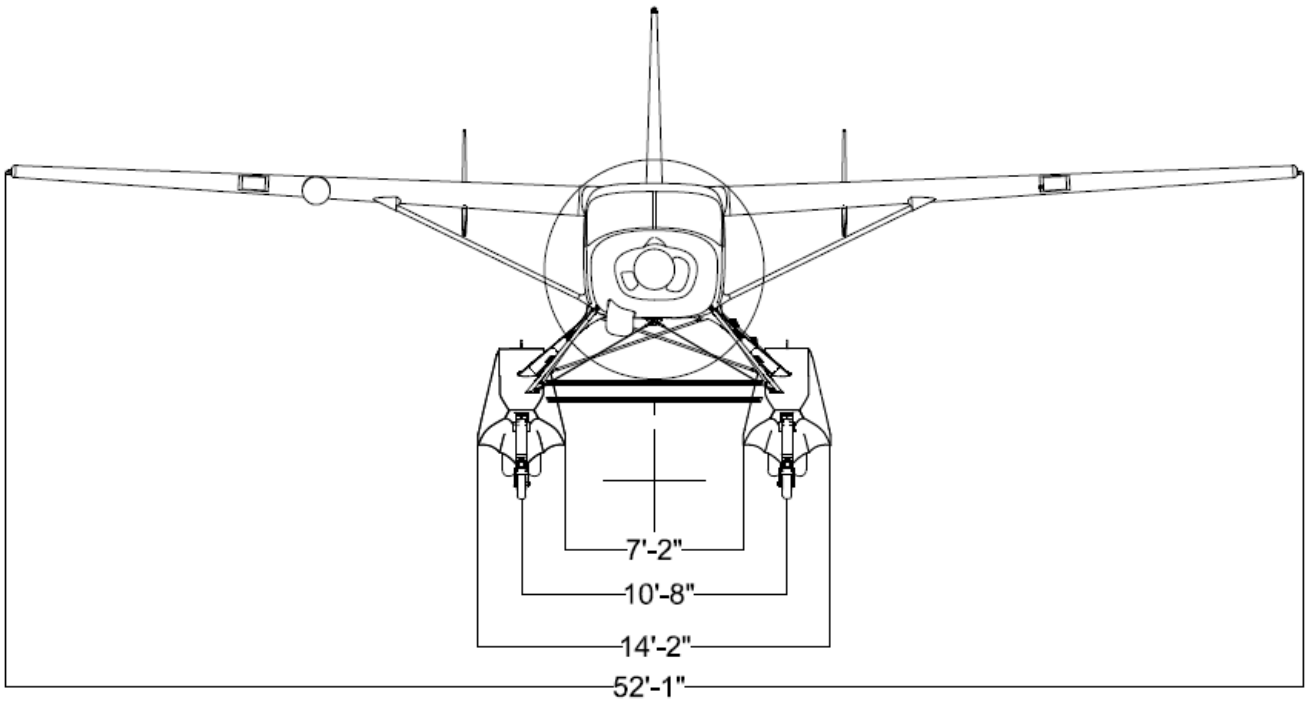


FIGURE 1-3 FRONT VIEW
CESSNA 208B CARAVAN

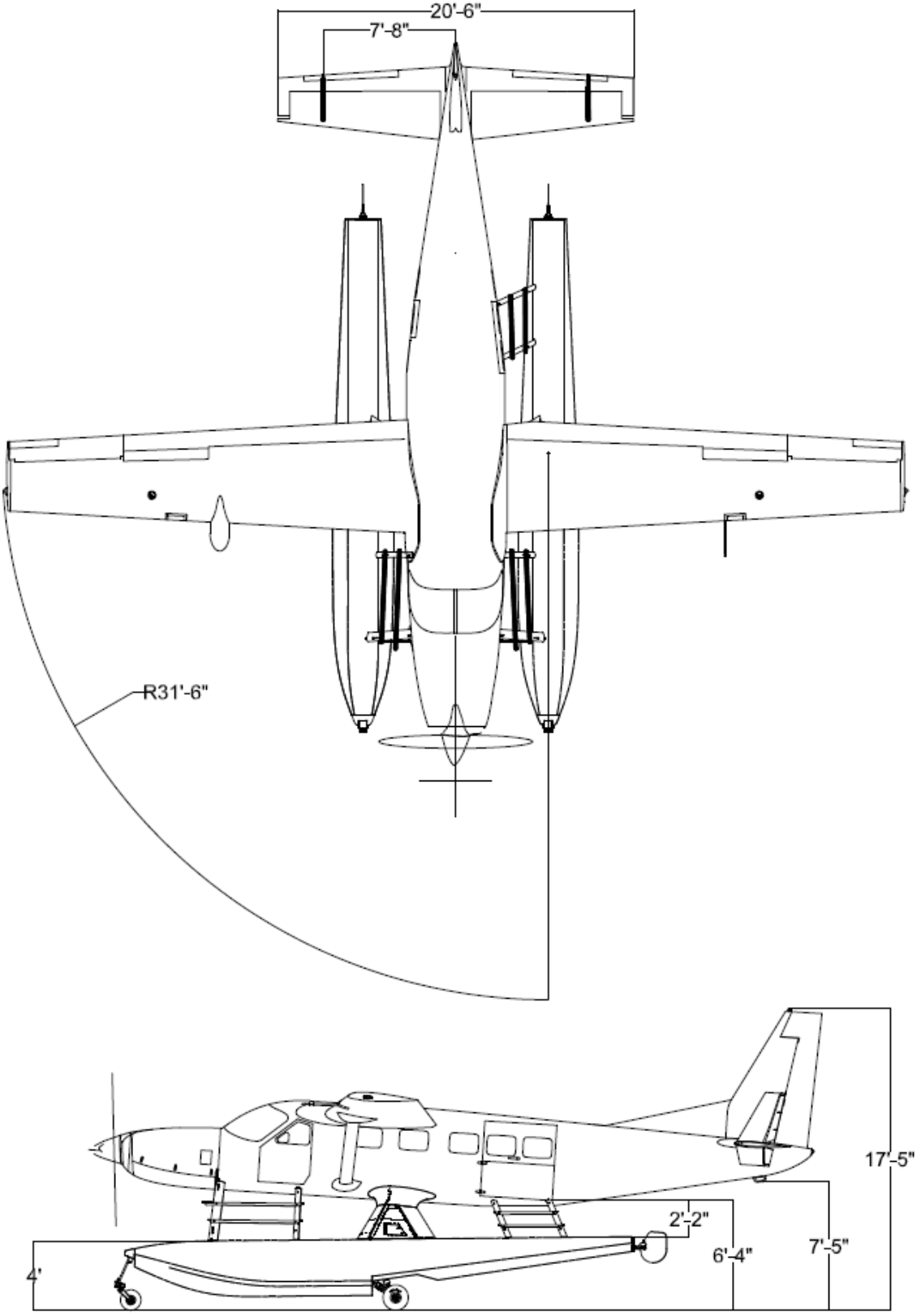


FIGURE 1-4: TOP & SIDE VIEWS
CESSNA 208B CARAVAN

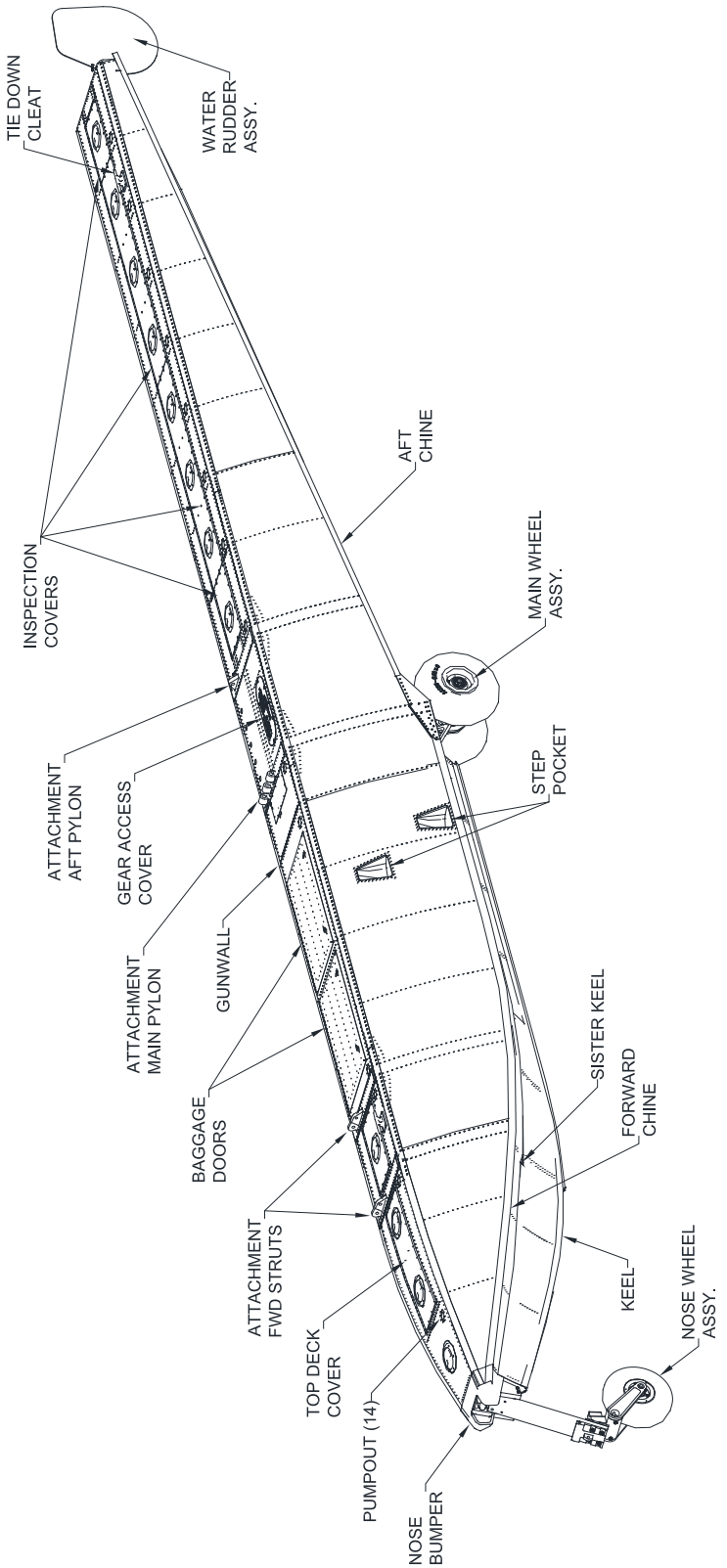


FIGURE 1-5: FLOAT TERMINOLOGY

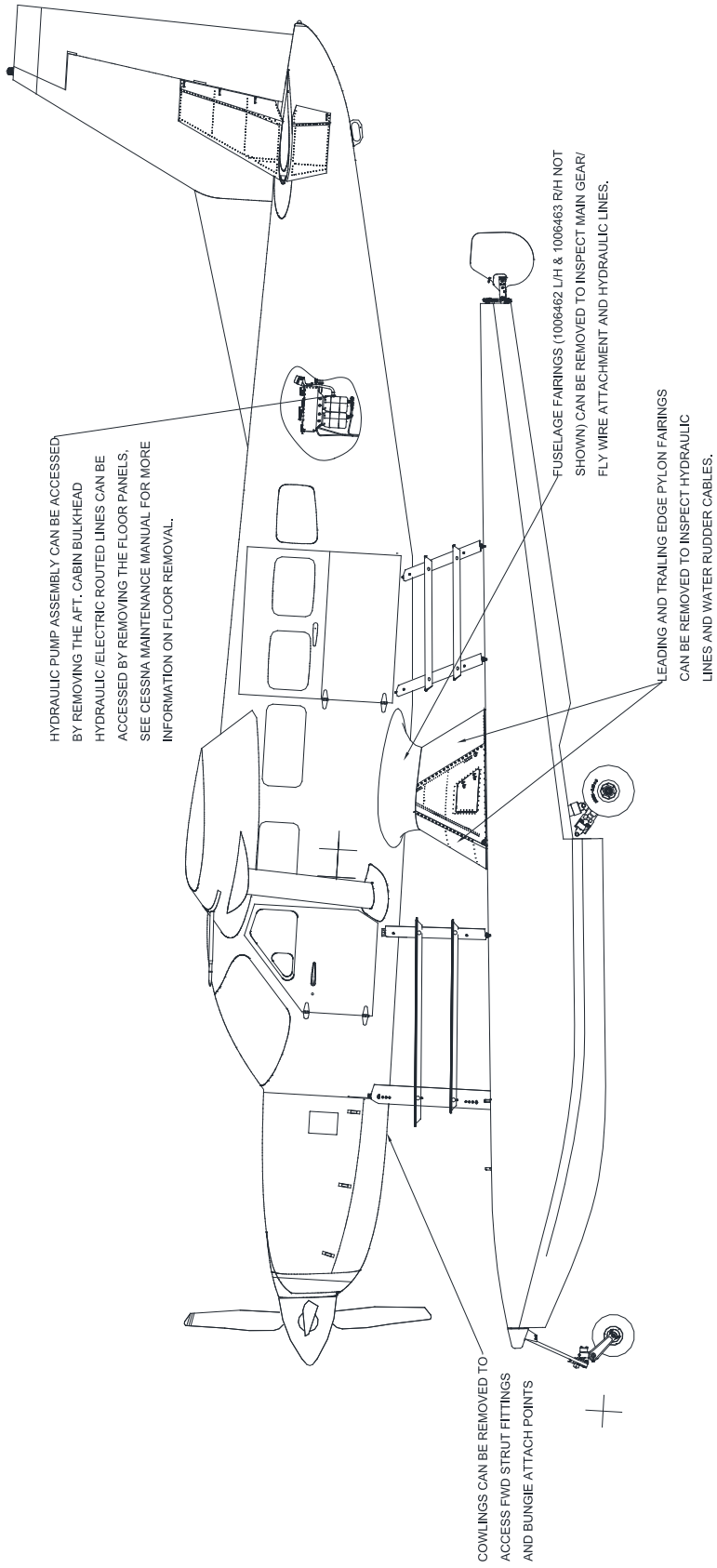

HYDRAULIC PUMP ASSEMBLY CAN BE ACCESSED BY REMOVING THE AFT. CABIN BULKHEAD HYDRAULIC /ELECTRIC ROUTED LINES CAN BE ACCESSED BY REMOVING THE FLOOR PANELS. SEE CESSNA MAINTENANCE MANUAL FOR MORE INFORMATION ON FLOOR REMOVAL.
FUSELAGE FAIRINGS (1006462 L/H & 1006463 R/H NOT SHOWN) CAN BE REMOVED TO INSPECT MAIN GEAR/ FLY WIRE ATTACHMENT AND HYDRAULIC LINES.
LEADING AND TRAILING EDGE PYLON FAIRINGS CAN BE REMOVED TO INSPECT HYDRAULIC LINES AND WATER RUDDER CABLES.
COWLINGS CAN BE REMOVED TO ACCESS FWD STRUT FITTINGS AND BUNGIE ATTACH POINTS

FIGURE 1-6: MAINTENANCE ACCESS POINTS

1.1 GENERAL FLOAT INFORMATION

The model 8750 amphibious float is an all aluminum structure. The alloy used throughout is mostly corrosion resistant 6061-T6, with 2024-T3 and 7075-T651 used in strength critical fittings and panels. Interior parts are cleaned, acid-etched and then primed prior to being riveted for enhanced corrosion resistance. Exterior surfaces are cleaned, alodine is applied as a corrosion resistant barrier, and then primed and custom painted.

Model 8750 floats contain sixteen (16) water tight compartments per hull. Access to the inside of the floats for cleaning, inspection and repairs is through the access covers on the float deck and the access covers inside the wheel well.

Figures 1-1 and 1-2 show three view drawings of the Cessna 208 as installed on Wipline model 8750 amphibious floats.

Figures 1-3 and 1-4 show three view drawings of the Cessna 208B as installed on Wipline model 8750 amphibious floats.

As a part of the float installation, the following additional changes are made to the landplane:

1. The hydraulic landing gear retraction system components and cockpit controls are added
2. The landing gear emergency gear operation hand pump and system are added
3. A water rudder steering system is installed
4. Auxiliary Vertical Fins (Finlets) are added
5. A seaplane extended chord rudder is installed
6. TKS pod & reservoir (if equipped) is removed

Operational information is detailed in the Cessna 208 Airplane Flight Manual Supplement or Cessna 208B Airplane Flight Manual Supplement.

Actual displacement for each float in fresh water is:

Amphibian:
at 100% Buoyancy = 8240 pounds
at 80% Reserve = 9155 pounds

Seaplane:
at 100% Buoyancy = 8741 pounds
at 80% Reserve = 9712 pounds

LANDING GEAR

The landing gear incorporated within the amphibious floats is a retractable quadricycle type with two swiveling nose (or bow) wheels and four (4) (two (2) dual sets) of main wheels. Shock absorption is provided by air-oil shock struts on the two main landing gear assemblies and composite flat springs on the nose gear assemblies. Each main wheel is equipped with a hydraulically-actuated disc brake.

Landing gear extension and retraction is accomplished by two (2) electrically-driven hydraulic pumps and four (4) hydraulic actuators (one (1) for each gear).

The hydraulic pumps are located in the aircraft empennage and can be accessed by removing the aft cabin bulkhead. The hydraulic actuators are located adjacent to each gear.

Hydraulic system fluid level should be checked at 25-hour intervals and should be serviced to levels in accordance with the installed placard using MIL-H-5606 (red) hydraulic fluid. The fluid level placard (Figure 1-7) is installed on the forward hydraulic Reservoir.

FIGURE 1-7: HYDRAULIC FLUID LEVEL PLACARD

The nose wheels are fully castoring for maneuverability while the airplane is under engine power or being towed.

The main landing gear has dual 6:00x6 8-ply tires and the nose gear has a single 5:00x5 10-ply tire. All tires must be approved to TSO C62, type III. Differential use of the main-wheel brakes steers the aircraft on land.

Item	Fluid Type	Qty.
Main Gear Shock Strut	MIL-H-5606	975 +/- 20 mL 33 +/- 0.75oz.
Main Gear Shock Strut	Nitrogen or Air	425 +/- 25 psi
Main Gear Tires	Nitrogen or Air	60 +0/- 5 psi
Nose Gear Tires	Nitrogen or Air	60 +/- 5 psi
Hydraulic Pump reservoir	MIL-H-5606	A/R per placard

FIGURE 1-8: FLUID TYPES AND QUANTITIES

LANDING GEAR CONTINUED

Grease zerks are provided in many locations that have pivoting joints. Greasing is recommended at 25 hour intervals, or more often depending on operating environment, with HCF Grease or equivalent. See Figure 3-2 for nose gear grease zerk locations. See Figure 4-3 for main gear grease zerk locations.

STRUT PACKAGE

The strut package attaches the floats to the aircraft.

The strut package is comprised of the forward struts, main pylons, rear cross-wires, and front cross wires (or flying wires).

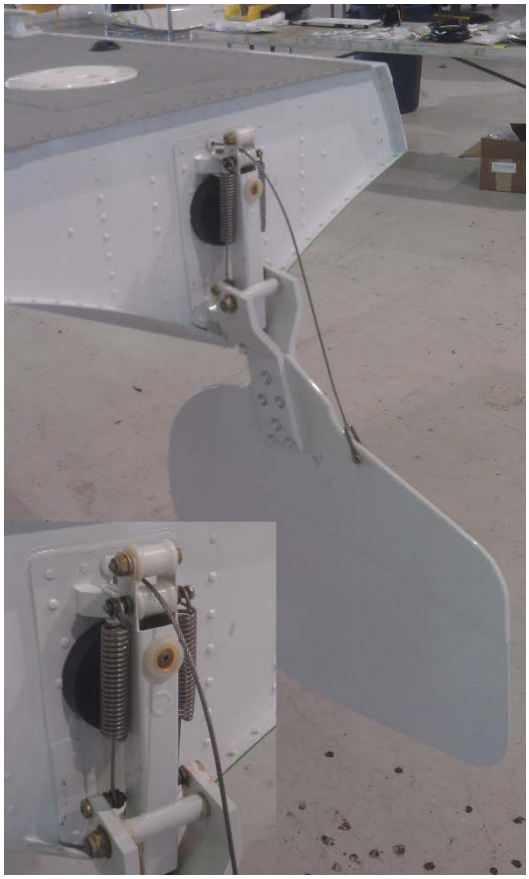
The streamlined struts are made from extruded aluminum alloys. The main pylon is built from machined aluminum trusses, internal ribs, and skinned with aluminum sheet.

WATER RUDDERS

The floats are equipped with water rudders attached at the rear of the float structure. These rudders steer when the floats are in the water.

Rudder controls are integrated into the existing aircraft rudder system and should move in the same direction as the air rudder.

Water rudders are extended and retracted with a handle installed to the right of the pilot seat.



Water Rudder & Springs

1.2 CLEANING

The outside of the float should be kept clean by washing with fresh water and soap. Special care should be taken to remove engine exhaust trails, water-line marks, and barnacle deposits. After salt water operations, washing with fresh water should be done daily with special attention paid to hard to reach places like:

- skin seams

- wheel well areas

- float attach points

- hardware

Alternatively, water taxiing in fresh water at step-speed can help flush the floats themselves, but additional rinsing should be conducted on struts and fittings. The float interior should be flushed out, especially if salt water or polluted water gets inside the compartments. If the floats are being stored inside a building either installed on the aircraft or not, it is strongly recommended to remove the inspection covers so the interior of the floats can dry out.

OPERATORS IN SALT WATER ARE STRONGLY CAUTIONED

RINSING THE AIRCRAFT AND FLOATS WITH FRESH WATER AT THE END OF EACH DAY IS CRITICAL. ADHERING TO THESE CLEANING RECOMMENDATIONS ARE VITAL FOR KEEPING CORROSION TO A MINIMUM. FAILURE TO CLEAN THOROUGHLY CAN SEVERLY SHORTEN THE LIFE OF THE FLOATS.
SALT WATER, POLLUTED WATER AND THEIR ENVIROMENTS, ARE STRONGLY AND DIRECTLY LINKED TO CORROSION AND MUST BE HANDLED PRO ACTIVELY.

Even without direct contact with saltwater, this hydraulic pump in the aircraft fuselage has severely corroded due to being in a saltwater environment without being kept clean.

Forward strut attach point under cosmetic fairing on aircraft fuselage.

CORRODED HOT SPOTS

- DISSIMILAR METAL CONTACT LIKE LANDING GEAR, FLAOT ATTACH POINTS AND OTHERS.
- ENCLOSED SPACES THAT STAY MOIST LIKE LANDING GEAR FLAOT INTERIORS, SKIN LAP-JOINTS, AND OTHERS.
- CONTAMANINATES ON THE METAL LIKE DIRT, SALT, ENGINE EXHAUST AND OLD OR OTHERWISE COMPRISED GREASE

Badly corroded fly-wire fitting

1.3 CORROSION

Corrosion is the process by which metals are turned into oxides. It is a natural and ultimately unavoidable chemical reaction that is accelerated by dissimilar metals in contact with each other, and enclosed spaces and contaminants like dirt and exhaust deposits that hold moisture against the metal. If that moisture is salt water or fresh water that is polluted, it conducts the electrolytes better and the process of corroding is faster.

Most aircraft and most floats are made out of aluminum due to its strength to weight ratio, and its ability to withstand fatigue and remain field repairable.

Steel is used for strength in hardware and landing gear parts, and these are often areas where these dissimilar metals cause corrosion.

Areas where moisture and dirt mix and stay wet against metal are common sites of oxidation. Float strut attach points, water rudders, and skin joints are examples of areas where this occurs.

1.3 CORROSION (CONT.)

Cladding, plating, anodizing, painting, greasing and waxing are all processes used to help protect metal from corrosion; Wipaire uses all these techniques during manufacture. But due to the rugged way our floats are used and the environment, these surface sealers become abraded or wear away, leaving the metal exposed.

Removal of corrosion is detailed more fully in Chapter 9, but there are a few things an owner can do to stop the spread of corrosion and minimize the damage. Aside from the already detailed cleaning and inspection procedures, an anti-corrosion spray like Corrosion X, or its equivalent, should be used liberally. Because it has the ability to displace moisture and contaminants, it can be used when the floats are still wet or when they are dry.

Periodically, hardware should be covered with waterproof grease. Especially in a salt water environment, bolts should be removed at least once a year and grease applied to the shafts, bolt/screw heads, and nuts.

1.4 FLOAT HANDLING & JACKING

To jack the floats for servicing tires, brakes, or doing retraction tests, it is recommended that a floor type jack (three ton minimum.) be used if lifting apparatus is not available . These jacks are commonly used for truck repair. The jack should be positioned on the keel centerline on the first bulkhead forward of the step. The jack should contact the keel squarely and if room permits, slip a board between the jack and keel.

CAUTION!

Due to critical angle of aircraft when single float jacking; check that wing fuel tank valves are confirmed closed, if possible use wing tie rope from float side to be jacked and tie off to tug.

Raise the float slowly; making sure the aircraft stays balanced. After raising, block up the keel in several places and lower the jack. Raise only one float at a time with the opposite float wheels chocked. Position a sawhorse under main and after body keel to keep aircraft from tipping fore and aft.

TOWING

When towing the amphibian aircraft, two lugs are provided on the lower forward side of the nose spring. A rigid “V” frame can be fabricated to attach to these lugs for towing the aircraft with a tractor. Wipaire parts has this tow bar available for purchase.

HOISTING

Hoisting the aircraft can be performed using a lifting apparatus that attaches to the aircraft with lifting rings which are installed at the wing spar joints. Contact Wipaire Parts for details if necessary to remove or install floats

LEVEL

The level reference for the Caravan is two jig located nut plates and screws installed on left side of fuselage below side windows and forward of cargo door. Weight and balance information should be taken with aircraft in a level attitude. The float deck is at a 4 degree nose-down incidence from the aircraft level reference.

1.5 MOORING

For land operations, the aircraft is equipped with three fixed mooring points. Two are located on the outboard edge of the wing struts and the other is located on the underside of the tail section of the aircraft.

Mooring Procedure on Land:

1. Position the aircraft near mooring location and it point into the wind.
2. Set the parking brake and/or chock the main wheels.
3. Install the aircraft control column lock.
4. Install the flight control gust lock.
5. Tie down the aircraft to anchor points on the ground.
6. Install provided engine inlet covers, pitot tube covers, and propeller anchor assembly.
7. Attach a static ground cable to one of the aircraft tie-down eyelets and the ground anchor point.

For water operations, the floats are equipped with two deck cleats on each float, one forward near the pilot/copilot doors, and one aft near the cargo door.

Mooring Procedure on Water at Dock:

1. Position the aircraft near the dock and point into the wind as much as able.
2. Install the control column lock.
3. Install the flight control gust lock.
4. Tie down using both deck cleats to secure aircraft to dock and keep it from moving if wind direction shifts.

Mooring Procedure on Water at Buoy:

1. Position the aircraft near buoy.
2. Install the control column lock.
3. Install the flight control gust lock.
4. Tie to buoy using one deck cleat and leave sufficient slack in the rope so that the aircraft can move as the wind direction shifts without causing damage to aircraft.

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CHAPTER 2
AIRWORTHINESS LIMITATIONS

AIRWORTHINESS LIMITATIONS

This Airworthiness Limitations section is FAA approved and specifies maintenance required under paragraphs 43.16 and 91.403(c) of the Federal Aviation Regulations unless an alternative program has been FAA approved.

The aircraft Airworthiness Limitations are unchanged as a result of installation of the amphibious floats and the associated systems addressed by this STC.

FAA APPROVED_____

DATE 7/13/12

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CHAPTER 3
NOSE GEAR

3.0 NOSE GEAR

The nose gear consists of composite fiberglass beams that are attached on top to a moving carriage and on the bottom to blocks that caster. Inside the block is a castoring pin that is set into the machined fork assembly; the castoring pin allows the nose wheel to pivot 360 degrees. Geometry is such that no shimmy dampers are necessary.

The nose gear has an over-center down lock. Retraction occurs when pressure is applied to the forward face of the actuator piston and the carriage is drawn along the tracks in the nose box. Gear position light proximity switches are closed when the piston (containing magnetic material) has reached either end of its travel. Refer to Figure 3.1 for visual reference

The nose gear has single 5:00 x 5 10-ply tire. All tires must be approved to TSO C62, type III.

NOSE WHEEL AND TIRE REMOVAL

To remove each nose wheel

1. Jack the aircraft, completely lifting both hulls. It is not recommended to jack only one hull.
2. Cut cotter pin and remove axle nut.
3. Remove the AN4 bolt securing the opposite side of the axle.
4. Pull/Push the axle through the side plate. (either direction) taking care to set spacers aside as they are removed.
5. Wheel will drop out between side plates once axle has been removed a sufficient distance.

Each nose wheel is a split-type rim. To remove the tire:

1. Remove air from tire.
2. Remove six (6) bolts that hold the wheel together.
3. Split rim and remove tire and tube.

Nose tires should be replaced when the tread is worn through in any area. Reinstallation is the reverse of removal.

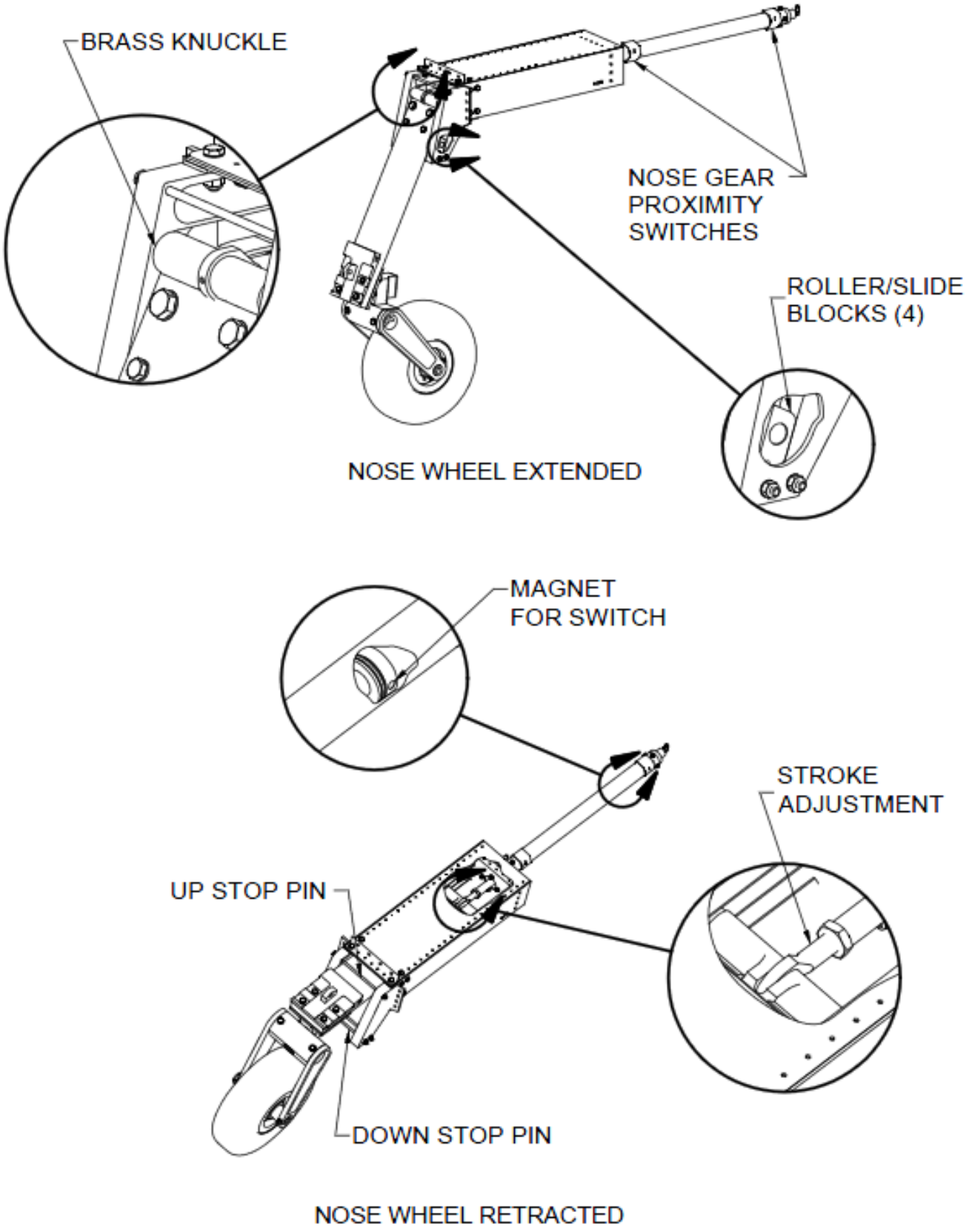

FIGURE 3-1: NOSE WHEEL & BOX

3.1 ADJUSTMENT/TEST
NOSE GEAR

Refer to Figure 3.1 for visual reference.

Adjustment of actuator stroke is provided at the ends of the piston rods.

The length of the nose gear rod is adjusted such that the over-center knuckle (brass) rollers just bottom out on the down side and the piston just bottoms out on the mounting flange. The up stops nests in the up-stop pins.

Nose gear proximity switches are located on clips that are mounted on the outer cylinder body, one on each end. The most forward switch is for the gear down lights and most aft is for the gear up position lights. Set the proximity switch mounting clip along outer cylinder body to a position such that the light goes out when the over-center track is about ¼ inch from bottomed position while traveling in the up direction. Lights should come on about 1/8 inch from the bottomed position while traveling in the down direction.

The cylinder piston has a magnet that will activate the proximity switches.

3.2 NOSE GEAR BASIC SERVICING

Refer to Figure 3-2 for visual reference. The nose gear pivot assembly should be cleaned and inspected every 25 hours or more frequently whenever in water for an extended period of time, especially saltwater. Tracks and blocks should be cleaned and left dry or alternately cleaned and wiped with a rag with dry silicone spray on it.

The nose wheels contain grease nipples for the wheel bearings. They should be greased every 25 hours.

Nose tires are standard 5:00 x 5, 10-ply, inflated to 60 +/- 5 psi. All tires must be approved to TSO C62, type III.

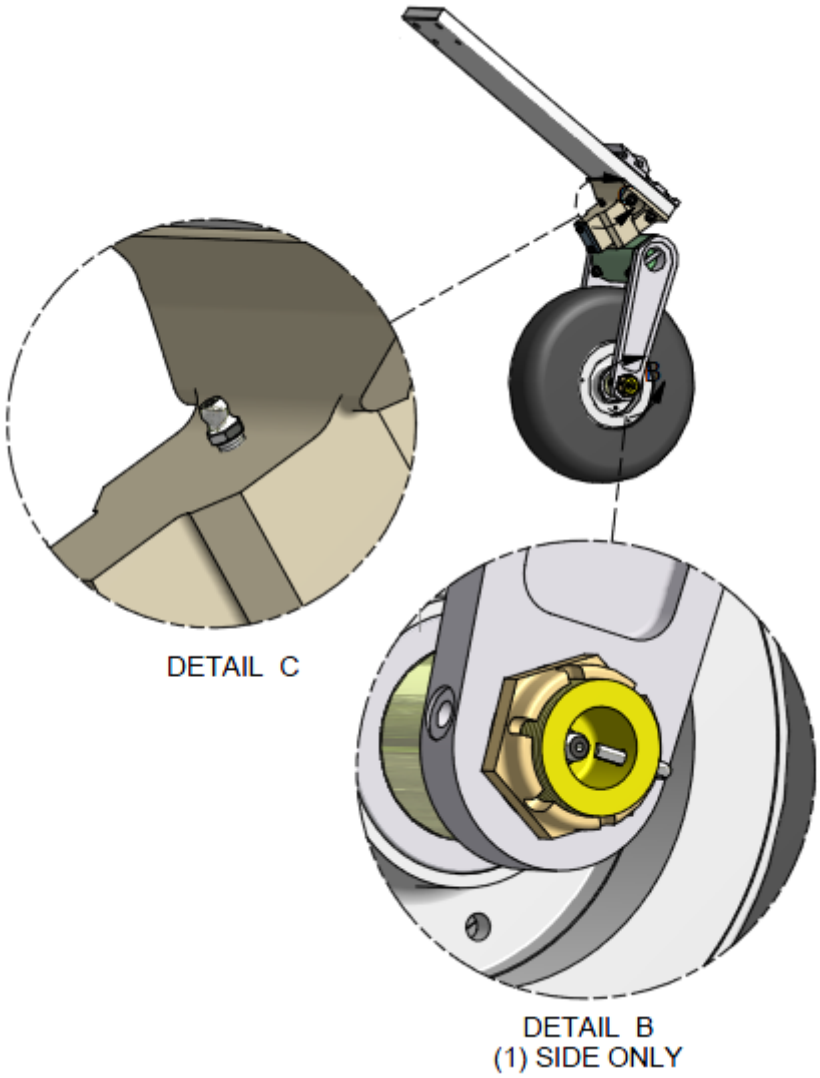

FIGURE 3-2: NOSE WHEEL GREASING

3.3 NOSE GEAR DISASSEMBLY

(In float or removed from float)

Items refer to areas on Figure 3-3

1. Disconnect hydraulic lines. Item 1

2. Remove the 4, NAS1103-2 bolts and washers attaching the Nose Ram, Item 2, to the flange assembly, Item 3, and slide the Nose Ram off of the flange assembly.

3. Inspect interior bore of the Nose Ram for corrosion and pitting.

4. Loosen AN316-10R Jam Nut, Item 4, on Nose Ram Rod End, Item 5.

5. Using a strap wrench or other suitable, non-marring tool, unthread the Ram, Item 6, from the Nose Ram Rod End. Do not attempt to remove the ram piston top (brass) from the ram shaft (stainless steel). They are assembled as a unit and permanently secured.

6. Remove Ram Assembly, Item 3, if desired to replace the T-seals, Item 10, felt wiper, Item 7, and plastic wiper, Item 8.

7. Replace T-seals on the Nose Ram, Item 9, and Ram Assembly, Item 3, if necessary. The T-Seal in the Cylinder End-Cap, Item 11, can be replaced by removing the NAS1103-2 bolts and removing the cap from the Cylinder.

8. Slide the Trolley, Item 12, out bottom of nose gear track.

9. If worn or damaged, replace the 4 Slide Blocks, Item 13, and the 2 Track Rollers, Item 14.

10. Grease the 2 axles, Items 15 & 16, when reassembling.

3.4 NOSE GEAR ASSEMBLY

Items refer to areas on Figure 3-3

1. Insert the Ram Assembly, Item 6, into the Flange Assembly, Item 3, if removed during disassembly.

2. Slide the Trolley, Item 12, with installed blocks and rollers into nose box track from bottom.

3. Pull forward on the Link, still attached to the Rod End, Item 5, to place the rollers, Item 14, into the down lock pocket on the nose box track.

4. Thread the Ram Assembly, Item 6, onto the Rod End, Item 5, until the ram piston contacts the Flange Assembly, Item 7, while at the same time the rollers are seated in the down lock pocket. Both the piston and the rollers need to bottom out against their respective mating parts at the same time.

5. Tighten the AN316-10R jam nut against the rod end.

6. Install the Nose Ram, Item 2, onto the Flange Assembly, Item 3, being careful not to nick T-Seals on bolt holes. Fasten with NAS1103-2 bolts and necessary washers.

7. Oil felt wiper through oil cup on the Flange assembly, Item 3.

8. Connect hydraulic lines to cylinder and cycle gear to fill cylinder with fluid.

9. Service hydraulic system with Mil-H-5606 if necessary.

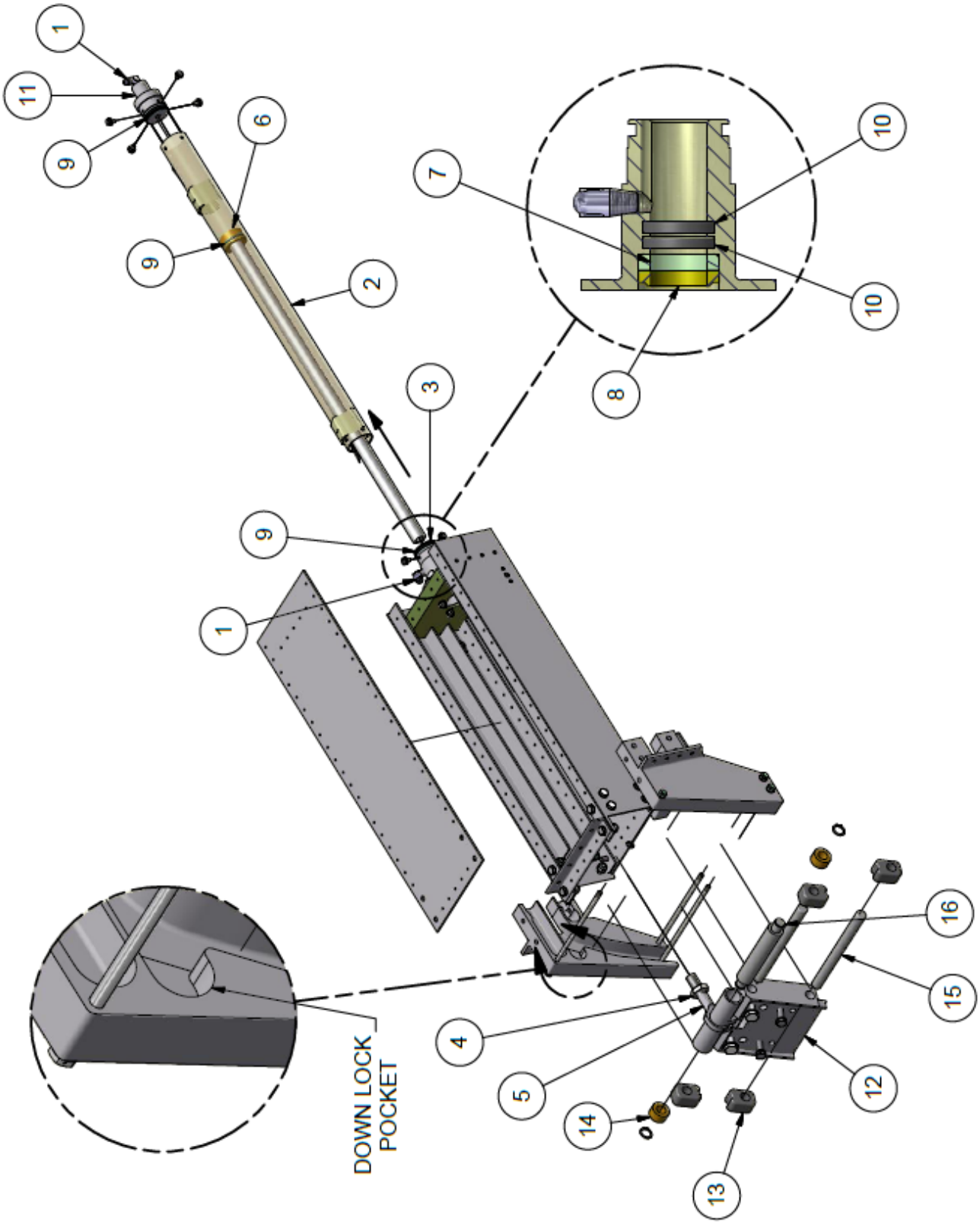

FIGURE 3-3: NOSE GEAR & BOX ITEMS

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CHAPTER 4
MAIN LANDING GEAR
BRAKES & GEAR
RETRACTION

4.0 GENERAL

The main landing gear incorporated within the amphibious floats are retractable, quadricycle type with four main wheels in a dual tire formation. Air-oil shock struts on the two main landing gear assemblies provide shock absorption.

The main landing gear has dual 6:00 x 6 8-ply tires. All tires must be approved to TSO C62, type III. The gear system is hydraulically actuated and driven by two hydraulic pumps. Brakes are hydraulic and there is a caliper on each main wheel.

BRAKE REMOVAL & INSPECTION

Each main wheel has a dedicated brake caliper. To remove the brake caliper:

1. Remove two mounting bolts on each caliper.
2. Compress the caliper piston using a c-clamp.
3. Slide caliper off of the brake disc.

Brake pads should be replaced when the minimum section thickness is less than 0.100", see Figure 4-1.

Generally, the brake discs should be checked for wear, grooves, deep scratches, and excessive pitting. Pitting deeper than 0.015" or thickness below 0.327" is cause for replacement.

MAIN WHEEL AND TIRE REMOVAL

To remove each main wheel:

1. Remove brake caliper.
2. Cut cotter pin and remove axle nut.
3. Pull wheel off of axle.

Each main wheel is a split-type rim. To remove the tire:

1. Remove air from tire
2. Remove 3 bolts that hold wheel together
3. Split rim and remove tire and tube

Main gear tires should be replaced when the tread is worn through in any area.
Reinstallation is the reverse of removal for tires, wheels, and brakes.

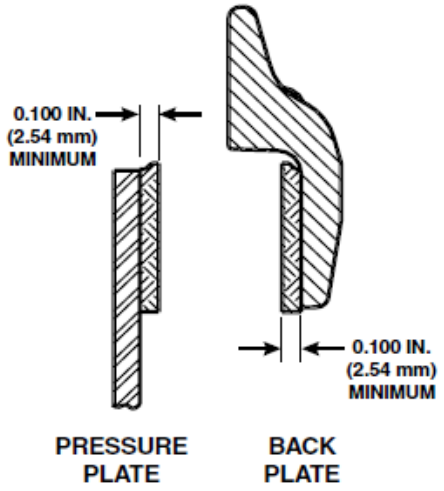


FIGURE 4-1: MINIMUM BRAKE LINING THICKNESS

MAIN GEAR/WHEEL ALIGNMENT

There is no way to adjust the alignment within each main gear wheel set. If the tires are showing signs of abnormal/unsymmetric wear, some component has likely been worn/bent. Starting with the axle, examine each main gear component and mounting point for signs of damage/deformation. Replace damaged components once found.

If no gear/bulkhead/airframe components are found to be damaged, use the following procedure to align left and right floats:

1. Move aircraft to level surface, ensure both nose wheels are facing aft (i.e. positioned for forward motion)
2. Measure the length of the forward flying wires, from the aft face of the clevis on each end. These distances should be equal. If they are not, loosen the jamb nuts and adjust the wires as required so the length of each is equal.
3. Tighten each forward wire until is snug, then tighten the jamb nuts. Wire should not be overly tight, but should be tight enough to prevent excessive motion at the center.
4. Next, tighten the aft wires in a similar fashion; measuring between the face of the clevises and loosening, then tightening the wires until they are of equal. Secure with jamb nuts.

BLEEDING BRAKE SYSTEM

Whenever the hydraulic brake lines are disconnected and reattached the brake system should be bled. To bleed the brake system:

1. Check that all lines are properly attached between the brake calipers and brake master cylinders
2. Check brake fluid reservoir level and fill to MAX line (located on the pilot side of the engine compartment mounted to the firewall).
3. Depress brakes using pilot pedals, brakes will likely be “spongy” and need significant travel to build braking force.
4. Loosen hydraulic fitting at one brake caliper just enough to let fluid and air seep out when brakes are actuated.
5. While one person actuates the brakes, a second person should watch the brake caliper with the loose fitting.
6. If air is in the system, actuating the brakes will cause bubbles in the fluid coming out of the loosened brake caliper fitting.
7. Actuate the brakes through full travel several times until all the bubbles have been released and fluid is being expelled at the loose caliper without signs of air.
8. Tighten the loose caliper fitting.
9. Check fluid level in brake fluid reservoir and refill to MAX line as necessary.

10. Repeat procedure at each caliper.
11. When complete, brakes should not feel "soft" or "spongy" when actuated.

BLEEDING BRAKE SYSTEM (ALT.)

When the Hydraulic Brake system is disconnected use the primary procedures listed in the previous section, or as an alternative method to bleed the brake system is cross bleeding between main gear calipers and to brake reservoir (Back Bleeding). To bleed the brakes system using this alternate method:

1. Connect pressurize brake bleeding system to outboard caliper.

CAUTION

WHEN PERFORMING CROSS BLEEDING, IT MAY BE NECESSARY TO REMOVE RESIDUAL FLUID FROM BRAKE RESEVERIOR TO PREVENT OVERFLOW.

2. Open inboard and outboard bleeders on main gear and pump fluid between calipers till all air has been purged from calipers.
3. Tighten inboard caliper bleeder and continue pressurization to reservoir till all air has been purged from line.
4. Perform steps 1 thru 3 on opposite main gear
5. When complete check brake fluid in reservoir service to max line if necessary.
6. When complete, brakes should not feel "soft" or "spongy" when actuated.

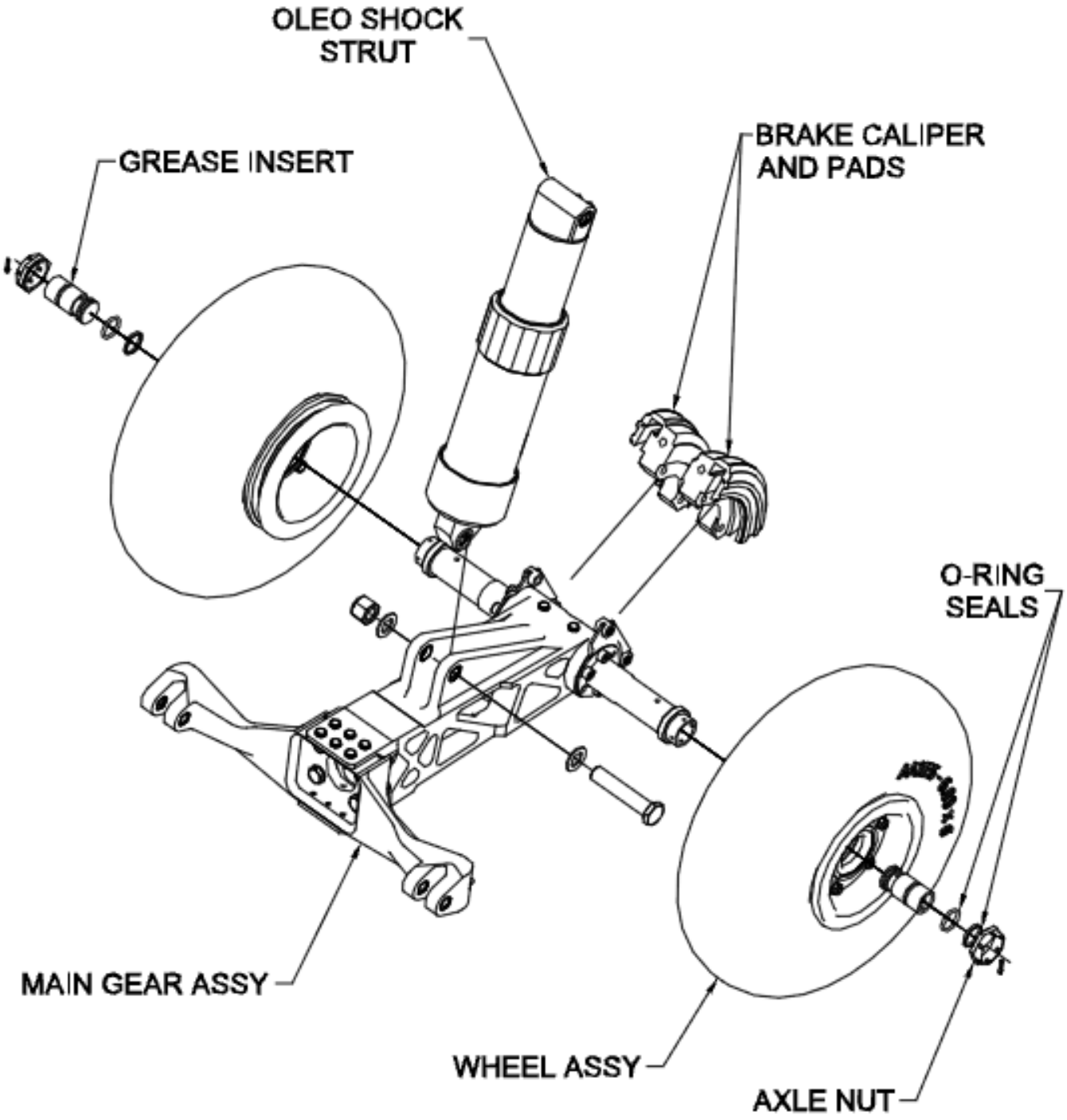


FIGURE 4-2: MAIN GEAR, LOWER

4.1 MAIN GEAR RETRACTION DESCRIPTION

Refer to Figures 4-1, 4-2, 4-3, 4-4A, 4-4B, 4-5 and 4-6 for visual reference.

Retraction and extension of the main gear is accomplished with a hydraulic rack and pinion type actuator. The actuator consists of two opposing pistons connected by a geared rack, with a rotating pinion gear in the middle.

Hydraulic fluid is transferred from one piston to the other using an electrically reversible hydraulic pump located in the empennage of the aircraft. The differential pressure build up causes the piston to move, pushing the rack and rotating the pinion gear and its attached drive shaft.

Attached to each end of the drive shaft are actuating arms that drive separate rod linkages with adjustable rod ends. The drive shaft and actuating arms have a keyway to prevent slippage on the rotating drive shaft. The rod linkages push and pull on the Main Gear Top Arm Assembly causing it to pivot around a fixed point. Also attached to the actuators drive shaft is a visual gear position indicator.

This indicator consists of colored bands that rotate with the drive shaft allowing the pilot to visually determine the position of the main landing gear by looking at a placard on the deck of the float.

Since the actuator rotates through approximately 193 degrees, the rod linkages and the actuating arm pass an over center point, preventing reverse driving of the rack and pinion actuator in both the fully extended and fully retracted positions. The actuator rotation is adjusted by setscrews that determine the length of travel of the actuator pistons. Providing an over center up-lock prevents inadvertent main gear extension in the case of a hydraulic failure.

As a secondary safety to ensure the geometry remains over center with a hydraulic failure, a spring is installed on the actuating arm preventing motion of the rack and pinion actuator. Since the retraction mechanism is over center, the weight of the landing gear and oleo, when retracted, also prevent the retraction mechanism from rotating past the over center point.

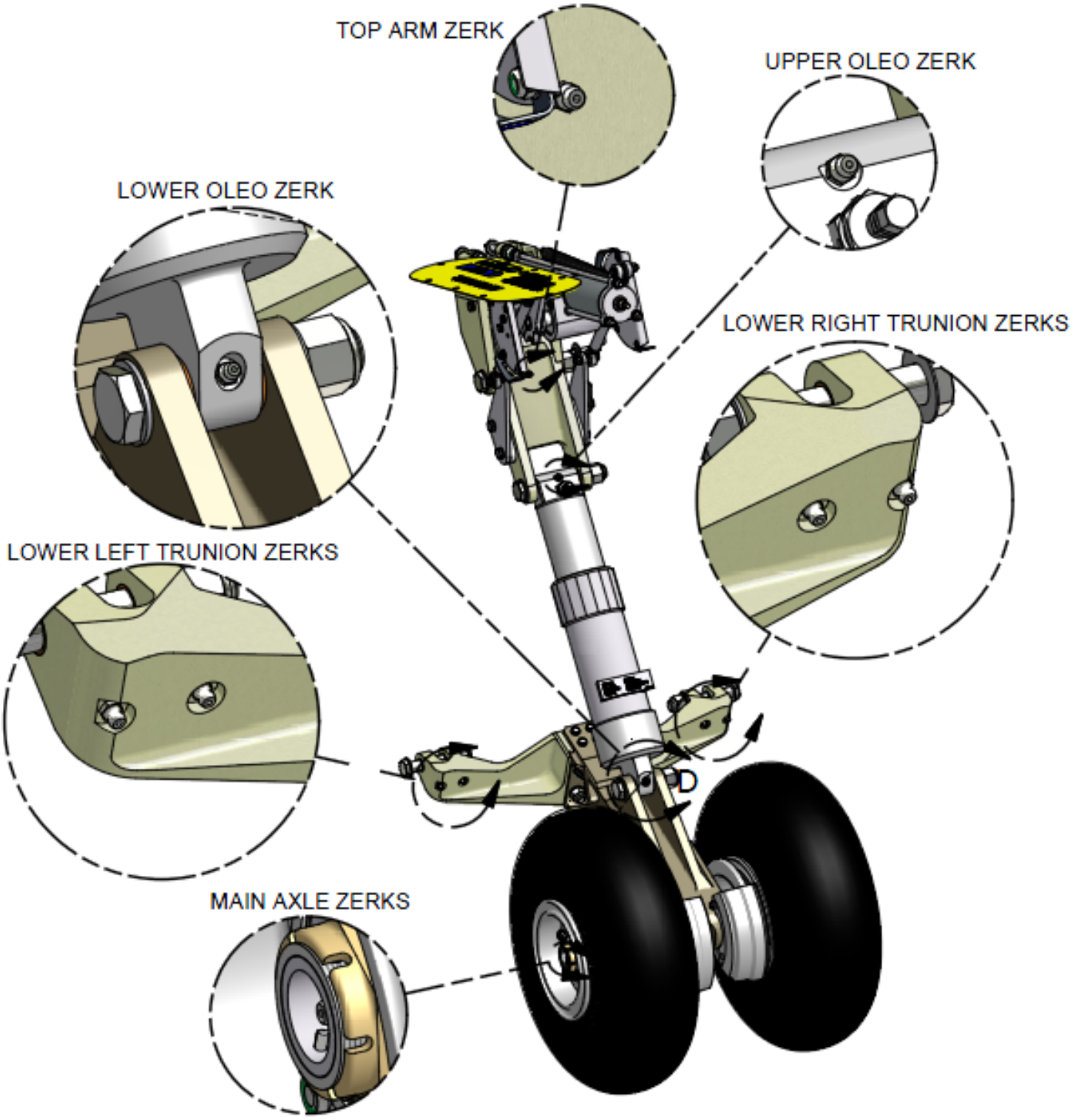


FIGURE 4-3: MAIN GEAR GREASING POINTS

4.1 MAIN GEAR RETRACTION DESCRIPTION (CONTINUED)

In addition to the over center locking provided by the rod linkages and actuator arm for the gear extended position, a second down locking method is provided as well. The geometry of the main gear drag link, oleo-pneumatic shock strut and the top arm assembly, provide an additional over center locking method. The force vector from the oleo, (directed in line with the centerline of the oleo assembly) rotates the contacting face on the top arm assembly into contact with the main gear top mount at all positions of oleo stroke. This transfers the landing load into a structure designed to withstand the generated landing forces, as well as prevents the top arm from rotating and collapsing the main landing gear.

There are two proximity switches on each main gear unit. One for sensing gear up position, and the other for gear down position. These are easily replaceable and can essentially be adjusted during maintenance, see figure 4-4A and 4-5. The proximity sensors have a built in LED to indicate when they are sensing the gear position. This feature greatly aids in the setup and servicing of the sensors.

There are several service points on the main landing gear to pay attention to during maintenance. Grease zerks are located on the pivots of the main gear draglinks, each wheel axle, top and bottom pivot points on the oleo-pneumatic shock strut, and the rotation point of the top arm assembly, see figure 4-3. The adjustable rod end bearings are permanently sealed and do not require servicing. Inspect the rod ends for freedom of movement and corrosion. Replace the rod ends when necessary. Depending on the operating environment, greasing requirements may vary. Highly corrosive environments, such as salt water, may require more frequent inspections. Regardless, the gear should be inspected visually at least every 25 hours for cleanliness and proper lubrication.

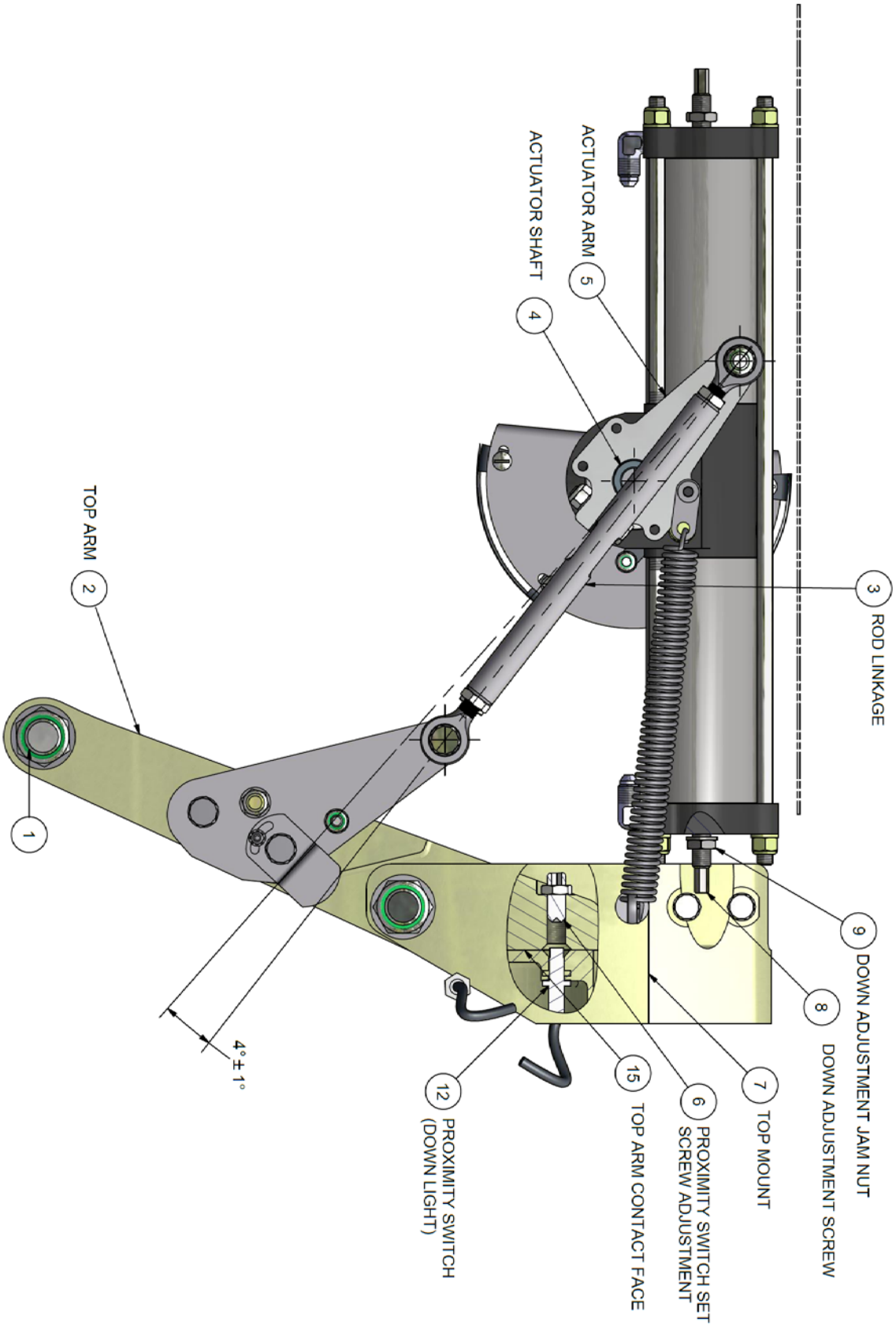


FIGURE 4-4A: MAIN GEAR ADJ. DOWN

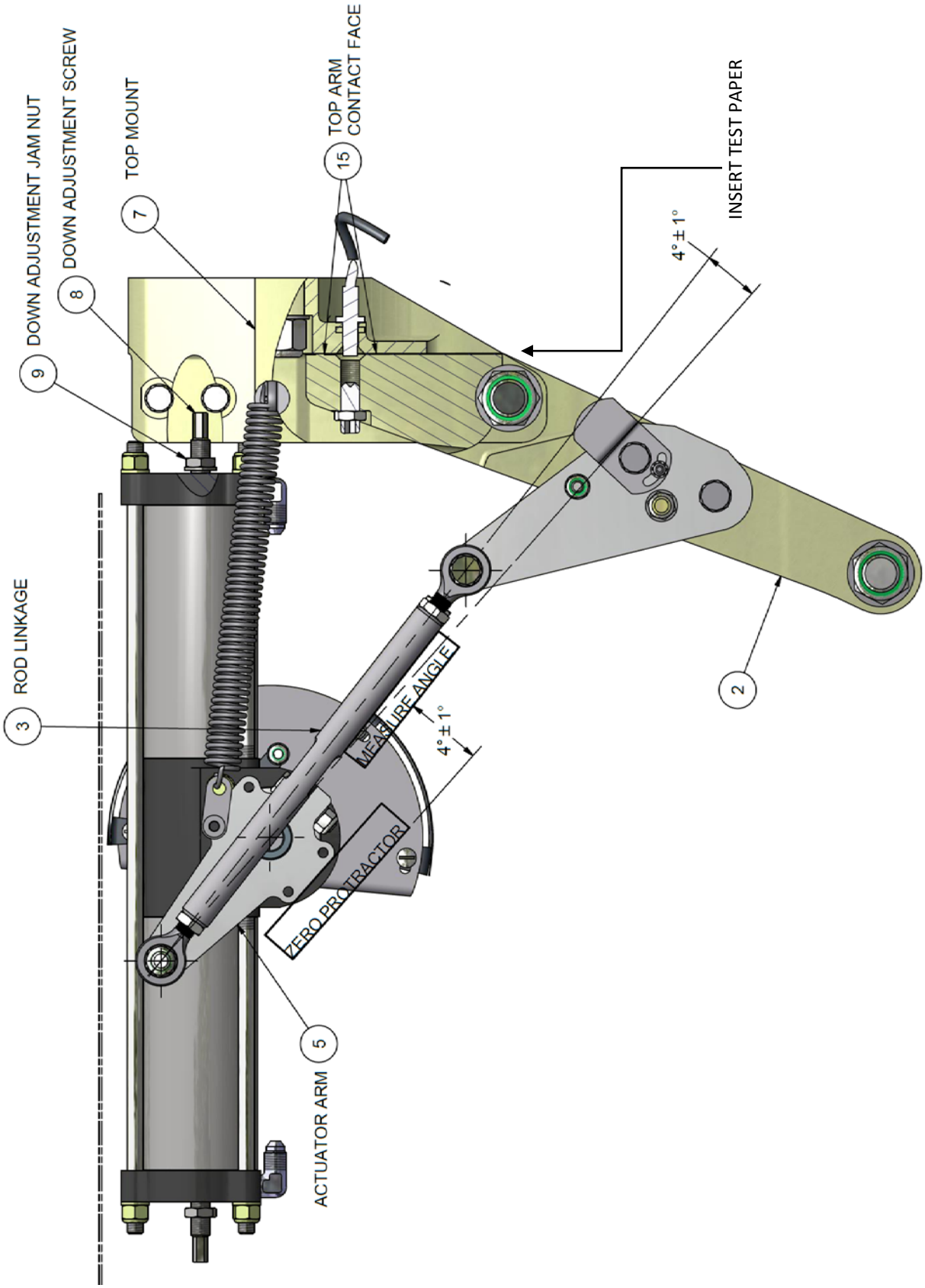


FIGURE 4-4B: MAIN GEAR ADJ. DOWN

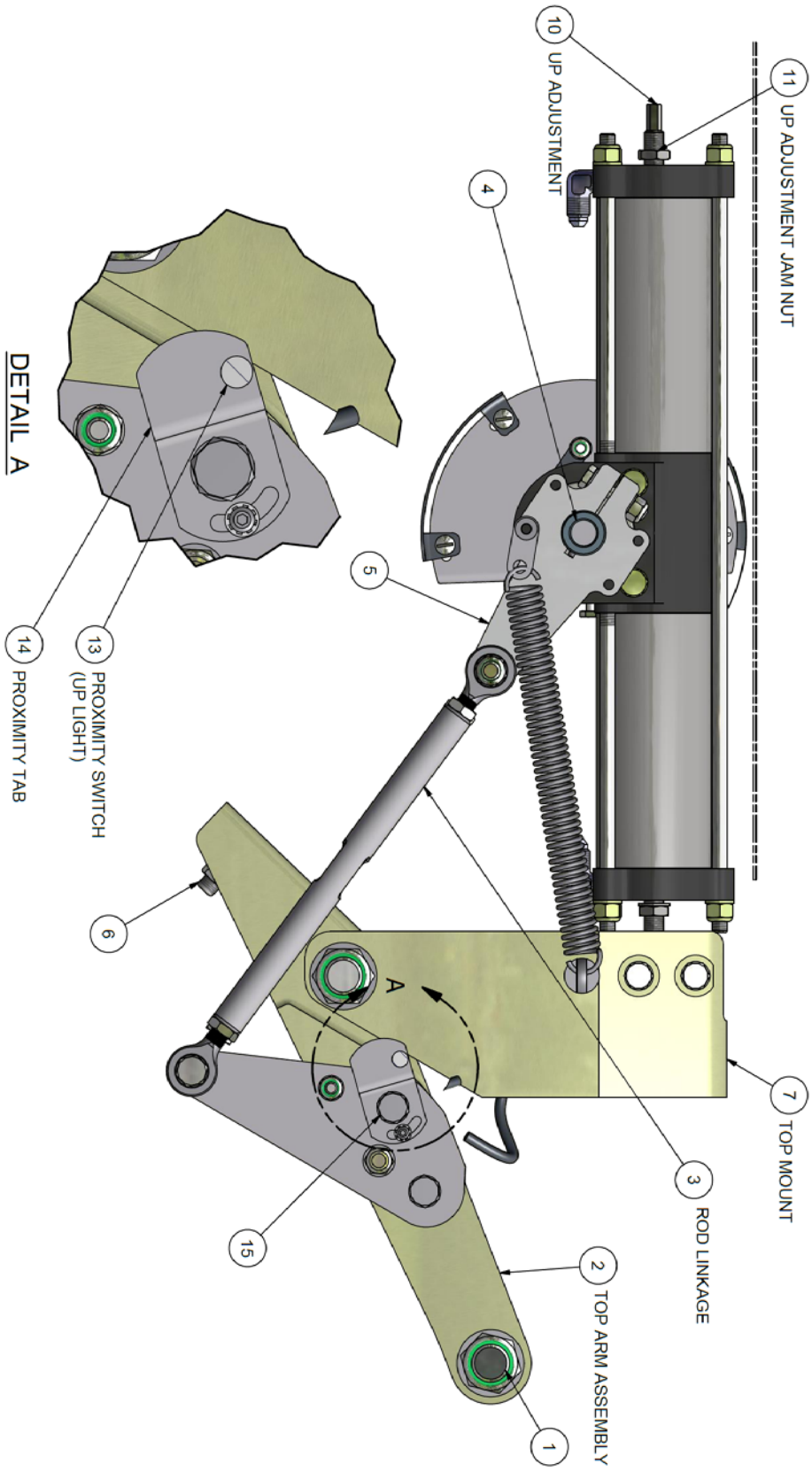


FIGURE 4-5: MAIN GEAR ADJ. UP

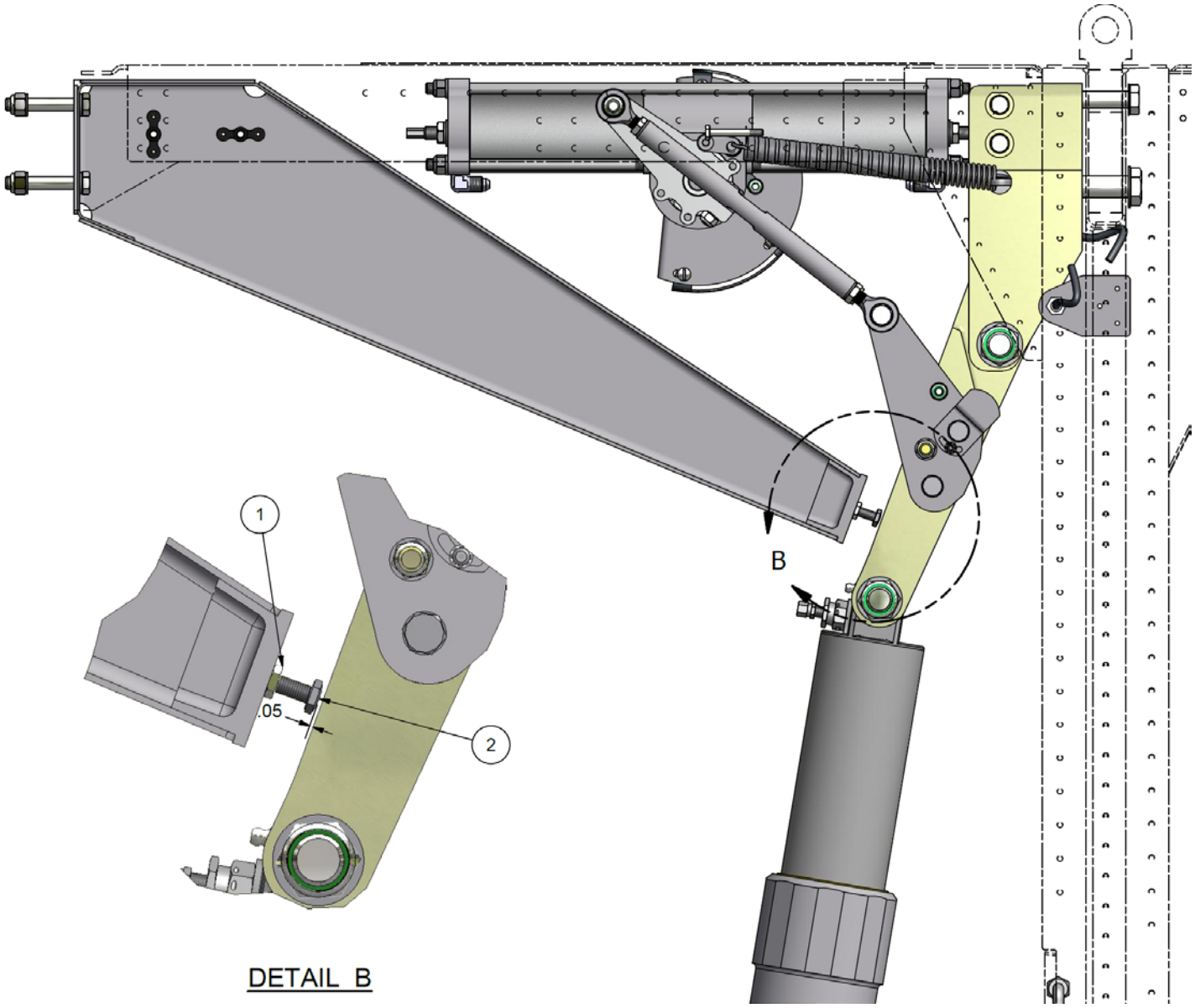


FIGURE 4-6: MAIN GEAR DOWN STOP ADJ.

4.2 MAIN GEAR ASSEMBLY SETUP AND ADJUSTMENT

Put aircraft on jacks to allow free extension and retraction of the landing gear. Use safe operating practices when working around moving hydraulic components. The actuators operate at high pressures and generate high forces when repositioning the landing gear.

Adjusting the Gear Down position:
(See figure 4-4A and 4-4B)

1. Bleed pressure off the hydraulic lines by moving emergency gear position selector both directions to Up and Down. This will relieve pressure in the lines allowing hydraulic lines to be unhooked without spilling fluid that is under pressure, Item 1. Leave emergency gear position selector in the Up position to allow actuator movement.

2. Remove the AN12 bolt at the top of the oleo shock strut attaching it to the top arm assembly, Item 1. This will allow the retraction mechanism to be repositioned by hand without having to move the weight of the tires, oleo and drag link assembly. Place a rag between the drag link and the bulkhead as the gear will rotate and make contact with bulkhead, possibly scratching the finish.

3. Remove the 4 nuts connecting the rod linkages (Item 3) to the actuator arms (Item 5). Remove the rod linkages from the arms. (Note: There are qty. 2 NAS1149F0463P washers between the rod end and the actuator arm.)

4. Remove the spring attached to the actuator arm.

NOTE: Steps 5 through 16 are for re-rigging the actuator. If no changes are done to actuator, skip to step 17.

5. Loosen the AN4 bolt and nut holding the actuator arms (Item 5) to the actuator shaft. Remove the two arms from the shaft being careful not to lose the parallel keys. It is not necessary to remove the visual gear position indicator assembly from the outboard actuator arm.

6. Remove the qty. 4, 5/16-18 bolts, that hold the actuator into the channel that runs across the top of the wheel well.

7. Allow the actuator to drop down from channel and remove the up and down hydraulic lines.

4.2 MAIN GEAR ASSEMBLY SETUP AND ADJUSTMENT (CONT.)

8. **NOTE**: The actuator should not need adjustment while in service. The only time adjustment should be necessary is when the actuator is disassembled in order to replace internal seals. Assuming this has been done the remaining steps are for re-rigging the actuator to be installed back in the float.

9. With the actuator assembled and removed from float, attach Wipaire Tool 1004800 to the actuator, taking note that the FORWARD arrow is pointing forward on the actuator. Use the 5/16-18 bolts to attach the tool to the actuator.

10. Rotate the actuator shaft fully to the DOWN position. If the two keyway slots do not line up when the actuators internal piston contacts the "DOWN" adjustment set screw (Item 8), the actuator needs adjustment. It may be necessary to use one of the actuator arms removed in step 5 to help rotate the actuator.

11. To adjust the "DOWN" position, loosen the "DOWN" adjustment screw jamb nut (Item 9) and back off the adjustment screw.

12. Align the keyway on the actuator shaft (Item 4) with the keyway on Wipaire Tool 1004800. Insert the parallel key removed in step 5 into the aligned keyways.

13. Thread in the Down Adjustment setscrew until light contact is made between the setscrew and the actuators internal piston. Do not over tighten as the actuator cannot rotate with Wipaire Tool 1004800 and the key installed. Over tightening can damage the face of the actuator piston.

14. With setscrew positioned against the piston face, tighten the adjustment screw jamb nut (Item 9).

15. Repeat steps 10 - 14 for setting the UP position setscrew. (See figure 4-5)

16. Install actuator in float by reversing steps thru 7. Safety wire 5/16-18 bolts when installed. Outer face of actuator arms should be flush to actuator shaft. It is recommended to leave the spring disconnected during gear rigging.

4.2 MAIN GEAR ASSEMBLY SETUP AND ADJUSTMENT (CONT.)

17. Reattach rod linkages to actuator arms. Loosen the rod linkage jamb nuts and lengthen the rods slightly (Item 3). Make equal adjustments to each rod.

18. Rotate actuator arms until the internal piston is against the Down Adjustment Screw.

19. Shorten the Rod Linkage until the Top Arm Contact Face (Item 15) touches the contact face of the Top Mount (Item 7). Make equal adjustments to each rod. Actuator needs to be rotated fully against the Down Adjustment Screw.

20. Visually inspect the Rod Linkage position (Item 3) versus the actuator shaft (Item 4). When rigged correctly, the bottom edge of the rod linkage should pass through the shaft as shown in Figure 4-4A.

21. Ensure gear is in down and locked position.

22. Using a small digital protractor, the over-center angle will be verified. Lay the protractor across the bottom of the lower two screw holes in the actuator arm. Note: Older float models may not have flat spot shown; use the same location as shown. Zero the protractor. See Figure 4-4B. Then place the protractor on the top or bottom of the rod linkage. The measured angle should be 4° ± 1°. Repeat for the other actuator arm and rod linkage by zeroing the protractor on the other actuator arm and measuring the rod linkage angle.

23. If angle is lower than required, the down Adjustment Screw (Item 8) should be turned out to allow more rotation. If the angle is greater than required, the actuator is over-rotating and the adjustment screw should be turned in. One turn of the adjustment screw changes the angle by approximately 2°.

24. If adjustments have been made to the Down Adjustment Screw, the Rod Linkage (Item 3) may need to be shortened or lengthened so that the Top Arm Contact Face (Item 15) still makes contact with the Top Mount.

25. Repeat steps 22 through 24 until angles measure within tolerance.

26. With setscrew positioned against the piston face, tighten the adjustment screw jam nut (Item 9).

4.2 MAIN GEAR ASSEMBLY SETUP AND ADJUSTMENT (CONT.)

27. Preload the rod linkages by shortening each rod by 1/2 turn after the contact faces touch on the Top Arm and Top Mount. Tighten the Rod Linkage jamb nuts.

28. Check the operation of the over center down lock. As the actuator rotates causing the contact faces to touch, the actuator arm should continue to rotate and "snap" past Top Dead Center (TDC). Make sure that there is preload on the linkage rods so that contact faces remain touching past TDC. Push and pull on the Top Arm Assembly (Item 2) to ensure it is locked over center. The Top Arm Assembly needs to be contacting the Top Mount (Item 7) when the gear is extended to properly transfer the landing loads. Ensure Top Arm and Top Mount are making contact by sliding a 3-inch wide piece of paper in (See Figure 4-4B and photo on this page), then moving gear to down and locked position. If paper is tight, gear is rigged correctly. If paper is able to slide out, then the Top Arm and Top Mount are not making proper contact and need further adjustment.

29. Reattach spring.

30. Loosen the (Fig 4-6, Item 1) jam nut on the Main Gear Down Stop Assembly, and screw in the NAS-428 adjustment bolt (Fig 4-6, Item 2). Verify the bolt does not touch the Top Arm when gear is in the down position. When the aircraft is off the jack stands and the weight of the aircraft fully on the

wheels, adjust the NAS-428 bolt to lightly make contact with the Main Gear Top Arm when the gear is in the full down position, then turn the bolt one and a half turns in so that the bolt no longer makes contact with the Top Arm. Gap should be about 0.050 inches. Tighten the jam nut.

NOTE: There are three "over center" locks on the main gear when the gear is down. The first is the over center rod linkages that are adjusted in the above steps. The second is from the spring pulling on the actuator arm when the gear is in the down position. The spring prevents the actuator from moving in the event of a loss of hydraulic pressure. The third comes in the form of the angle between the oleo-pneumatic shock strut and the Top Arm Assembly. The vector of the oleo force is "over center", about at the rotation point on the Top Arm Assembly. Thus, one could effectively remove the entire gear actuator, and the geometry of the Oleo and the Top Arm alone would force the contact faces of the top arm and top mount together and lock it "over center."

There are also two "over center" locks when the gear is in the retracted "UP" position. The first is a spring installed on the actuating arm that prevents motion of the rack and pinion actuator in the event of a hydraulic failure. The second over center lock comes from the geometry of the gear in the up position.

Since the retraction mechanism is driven over center, the weight of the landing gear and oleo, when retracted, prevent the retraction mechanism from rotating past the over center point. The weight of the gear wants to rotate the Top Arm Assembly, however, when rotating the Top Arm, the rod linkages must also move. The geometry is such that the rod linkages are "over center" on the actuator shaft centerline, and thus the rod linkages are trying to rotate the actuator more toward the "UP" position and in turn force the actuator piston face into the up adjustment setscrew.

4.3 ADJUSTING THE GEAR UP POSITION

1. DO NOT adjust the rod linkages (Item 3) when setting the over center up adjustment.

2. Rotate the actuator rotation arm fully toward the gear up position.

3. When the actuators internal piston contacts the "UP" adjustment setscrew, check to make sure all the linkages have rotated past Top Dead Center (TDC) by pushing and pulling on the Top Arm Assembly. The "UP" adjustment screw (Item 10) should not need to be adjusted if properly set using Wipaire Tool 1004800 during the actuator maintenance. (If it is found that one can reverse drive the rotary actuator and pull the gear down by hand, the rod linkage and the actuator arms have not moved past TDC. Re-check the position of the "UP" stop using Wipaire Tool 1004800. If the "UP" position is found to be correct, look for signs of damage in the floats as something is out of position preventing the stop setting using Tool 1004800 from being correct. Call Wipaire's Customer Service Department for specific instructions.

4. Bleed air from hydraulic system by actuating the gear several times with the electric hydraulic pumps. See Chapter 5, Section 5.1, for specific bleeding instructions.

5. If it is necessary to adjust gear up and down position switches proceed to next section. If not, lower gear and reattach oleo shock strut to top arm assembly. When aircraft weight is fully on the wheels, remember to set the NAS-428 bolt on the Main Gear Down Stop Assembly (refer to Section 4.2 Step 30).

4.4 ADJUST MAIN UP AND DOWN POSITION SWITCHES

1. With the aircraft still on jacks, position the gear in the "UP" position. This allows access to the gear down proximity switch.

2. Loosen the jam nut on the Gear Down Proximity Switch located on the back of the Main Gear Top Mount. Thread the Gear Down Proximity Switch in or out until the face of the sensor is flush with the face of the Main Gear Top Mount. Reference Figure 4-4B. Tighten the jam nut on the proximity switch to 10 +/- 3 inch-pounds.

3. Thread out the Set Screw Adjustment (Item 6), located on the Top Arm Assembly (Item 2).

4. Position the gear in the "DOWN" position. With the aircraft master switch on, thus providing power to the proximity switch, thread the Set Screw Adjustment (located on the Top Arm Assembly) in until the LED light built into the proximity switch initially illuminates with the gear arm in the full down over center locked position, then thread the set screw in an additional half turn.

5. Reposition the gear to the "UP" position.

6. Loosen the jam nuts on the gear up proximity sensor.

7. Adjust the gear up proximity sensor switch to have between a 0.030 - 0.060" gap between the proximity sensor plate and the proximity sensor. Tighten the jam nuts on the proximity sensor to 10 +/- 3 inch-pounds.

8. At this point, check to insure that the built in LED on the proximity sensor is illuminated when the sensor plate is rotated in front of the sensor.

9. With the gear in the full up position, loosen the AN6 bolt holding the proximity sensor plate to the Main Gear Top Arm and the socket head cap screw that prevents rotation of the sensor plate.

10. Rotate the sensor plate so that the sensor is near the edge of the plate with the gear in the up position. Reference Figure 4-5 inset.

11. Tighten the AN6 bolt, socket head cap screw, and re-safety AN6 bolt.

12. Check for proper light illumination on the gear selector in the cockpit in both the up and down position.

13. If necessary, reattach the oleo shock strut to the Top Arm Assembly.

14. Remove aircraft from jack stands

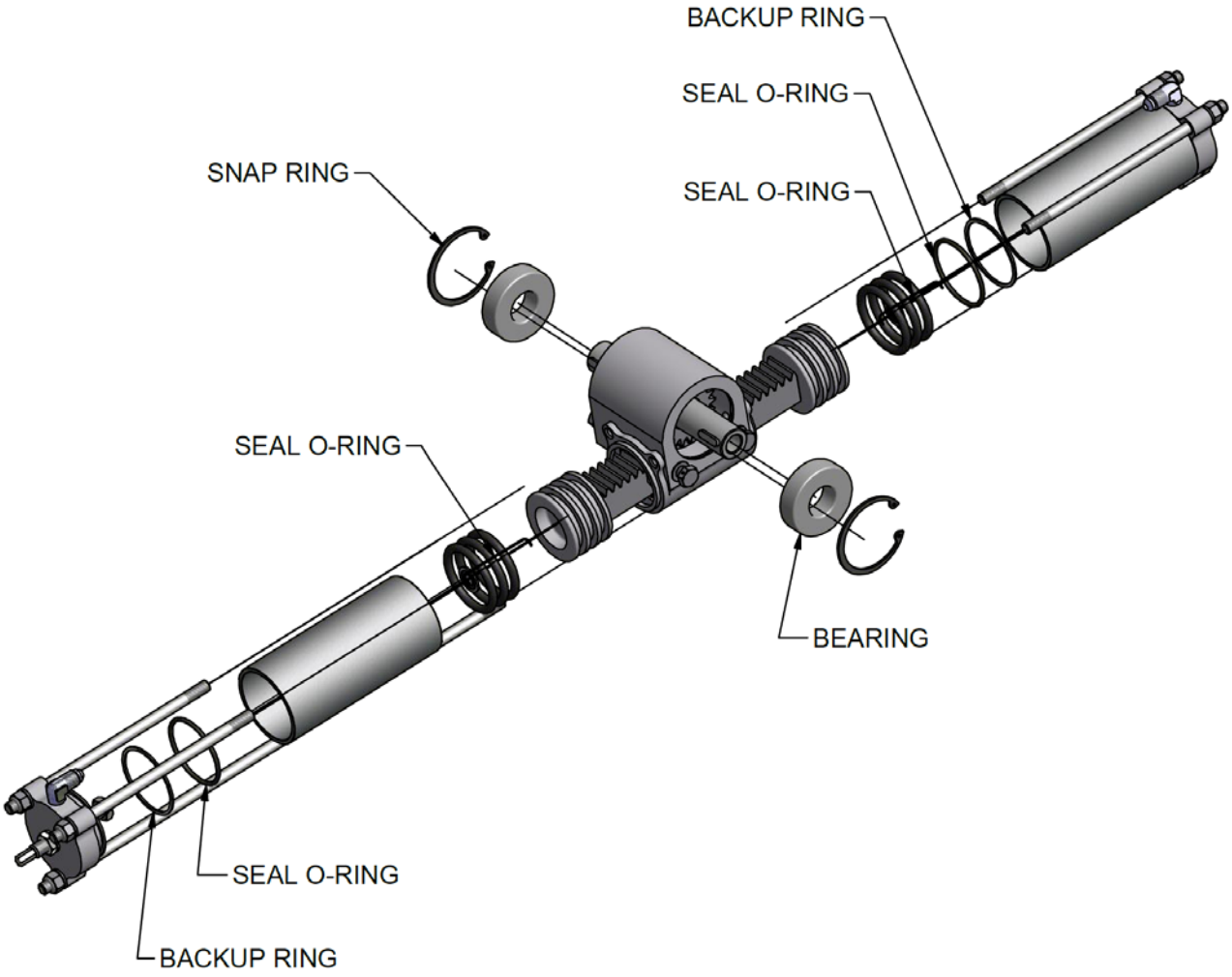


FIGURE 4-7: ROTARY ACTUATOR

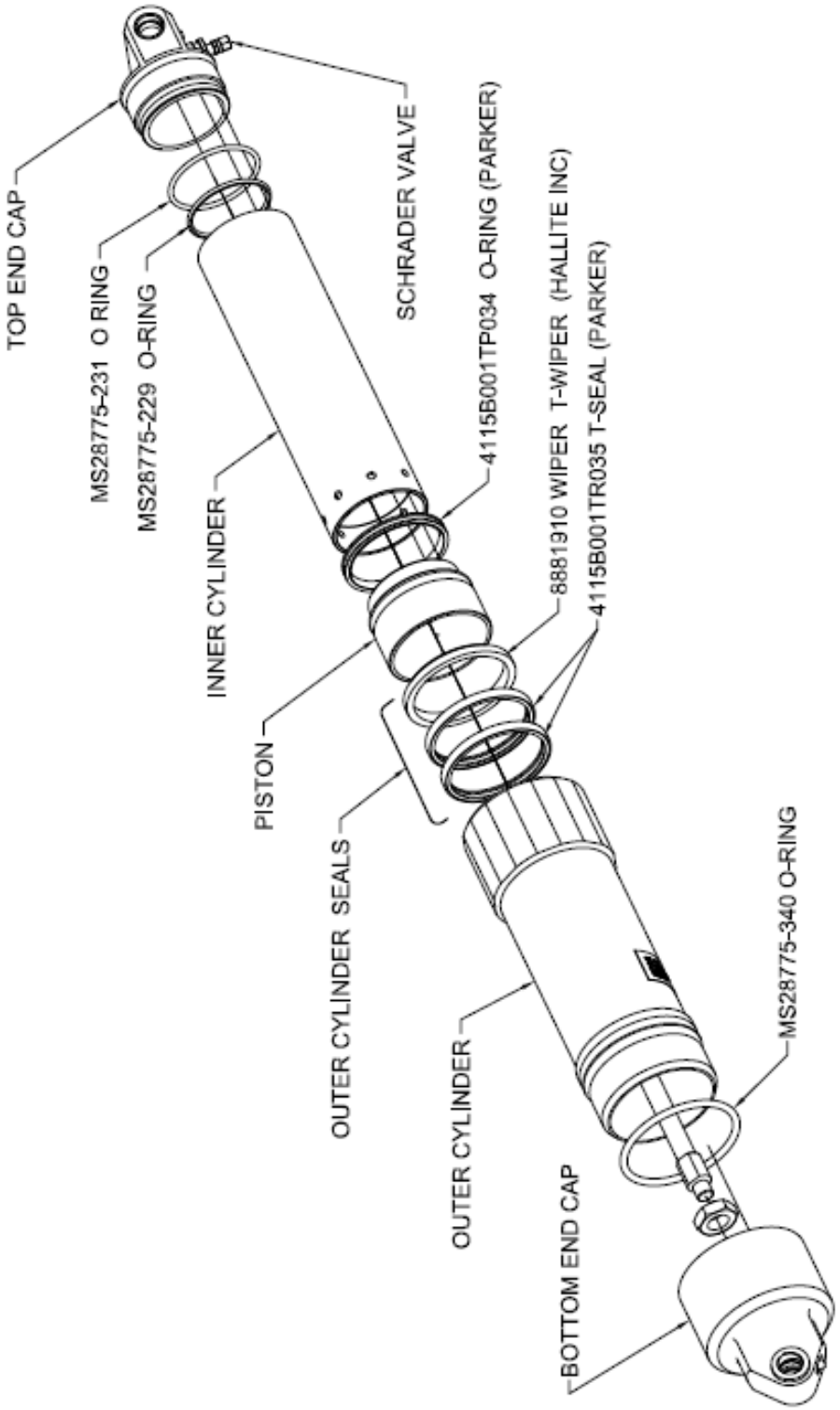


FIGURE 4-8: MAIN SHOCK STRUT

4.5 EMERGENCY GEAR OPERATION

An emergency hand pump is provided in case of total electric pump failure or loss of fluid. The emergency hand pump draws hydraulic fluid from the bottom of the hydraulic power pack reservoir. The hydraulic power pack electric pumps have fluid pickup tubes that do not reach the bottom of the hydraulic fluid reservoir. This prevents the electric pump from being able to pump all the fluid out of the system.

The remaining small reserve quantity of fluid below the electric pump pickup tube is then reserved exclusively for the emergency hand pump. The quantity of reserve fluid below the electric pump pickup tubes is sufficient to raise or lower the landing gear with the hand pump alone.

CHAPTER 5
HYDRAULICS

5.0 HYDRAULIC SYSTEM

WET HANDLE VS. DRY HANDLE SYSTEM

These instructions are for the later model "dry handle" hydraulic system that is used for new 8750 float installations. For legacy installations retrofitted from 8000's to 8750s, the "wet handle" pump system may be installed.

The dry handle system is characterized by a gear selector head containing an electrical switch that is connected with wires to the aft fuselage mounted pump. The pump direction is reversible.

The legacy wet handle system is characterized by a gear selector head that contains a mechanical valve and is connected with hydraulic lines directly to the gear. The pump direction is *not* reversible.

For retrofit installations, where the model 8750 is mated to the wet handle equipped aircraft, operation of the hydraulic system is the same as with the model 8000 installation – pressure and return lines at the fuselage exits are connected to pressure and return lines at the strut (pylon) attach points.

The only electrical difference between the standard and retrofit hydraulic system is the addition of a port and starboard (low) power wire that runs to the powered proximity switch that commands main gear position indication. See drawing number 1006012, revision A, or later approved revision, for electrical information pertaining to the hydraulic system.

See drawing number 1006004, latest revision for hydraulic system descriptive information for the retrofit installation.

For Cessna 208 see drawing number 1006005, revision A or later approved revision, or for Cessna 208B see drawing number 1006016 revision A or later approved for hydraulic system descriptive information for the current production installation.

From the aircraft belly – up the hydraulic system should be maintained with ICA document number 1002554, revision G or later approved revision, as applicable to the model 8000 installation.

From the aircraft belly – down, the hydraulic system shall be maintained with these ICA

The following instructions pertain to the current production dry-handle system configuration with reversible pumps.

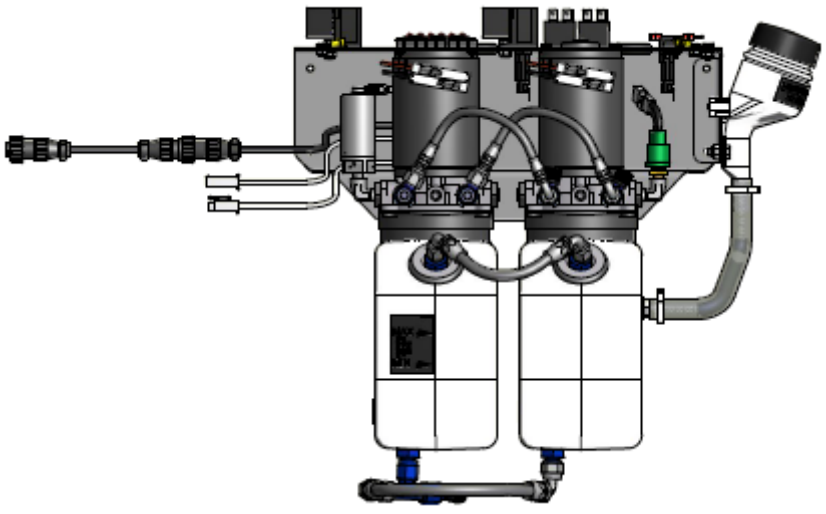
BASIC DESCRIPTION

A pressure of between 500 psi and 700 psi in the “DOWN” position and 500 psi and 1200 psi in the “UP” position is maintained in the supply line. When the pressure falls below 500 psi in the “UP” and “DOWN” position, the pressure switch activates the pump solenoid, providing power to the pump.

When the pressure reaches 700 psi in the “DOWN” position and 1200 in the “UP” position, the pressure switch deactivates the solenoid and the pump motor stops. A check valve on the output side of the pump retains pressure in the system while the pump is off.

The pump has an interval relief valve that directs fluid back to the un-pressurized pump reservoirs when the line pressure exceeds 1400 psi. The system also has an internal relief valve to protect against thermal expansion when line pressure exceeds 1900 psi.

A timer circuit is included on the powerpack that commands pump operation briefly regardless of pressure switch position when a new gear position is selected; this allows the gear system to avoid potential thermal lock caused by fluid expansion during flight or on the ground.



“POWERPACK” PUMP ASSEMBLY, IN AFT FUSELAGE

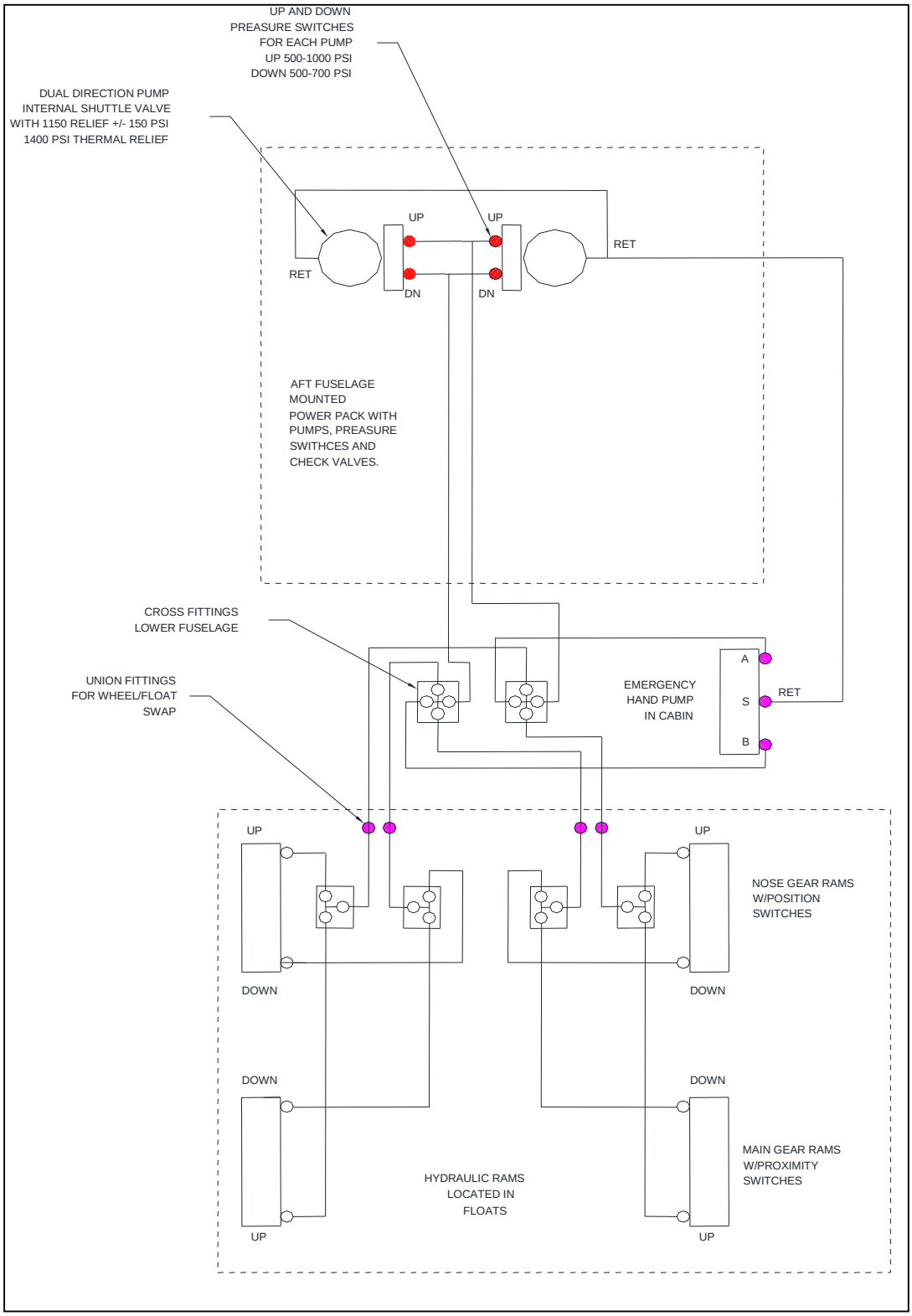


FIGURE 5-1: HYDRAULIC SCHEMATIC

5.1 BLEEDING THE HYDRAULIC SYSTEM

The system automatically bleeds, provided sufficient oil is maintained in the reservoir. To check the fluid level, fill the reservoir through the servicing point on the power pack assembly with MIL-H-5606 hydraulic oil and cycle the gear.

If the reservoir empties, stop the cycle by pulling the pump motor circuit breakers. Fill the reservoir again and complete the cycle. Continue this procedure until the fluid level in the reservoir stabilizes (it will vary in level between gear up and down positions).

If the fluid level continues to decline during gear cycles, check for external leaks. When the fluid level stabilizes, fill the reservoir to the normal operating range as placarded on the pump reservoir.

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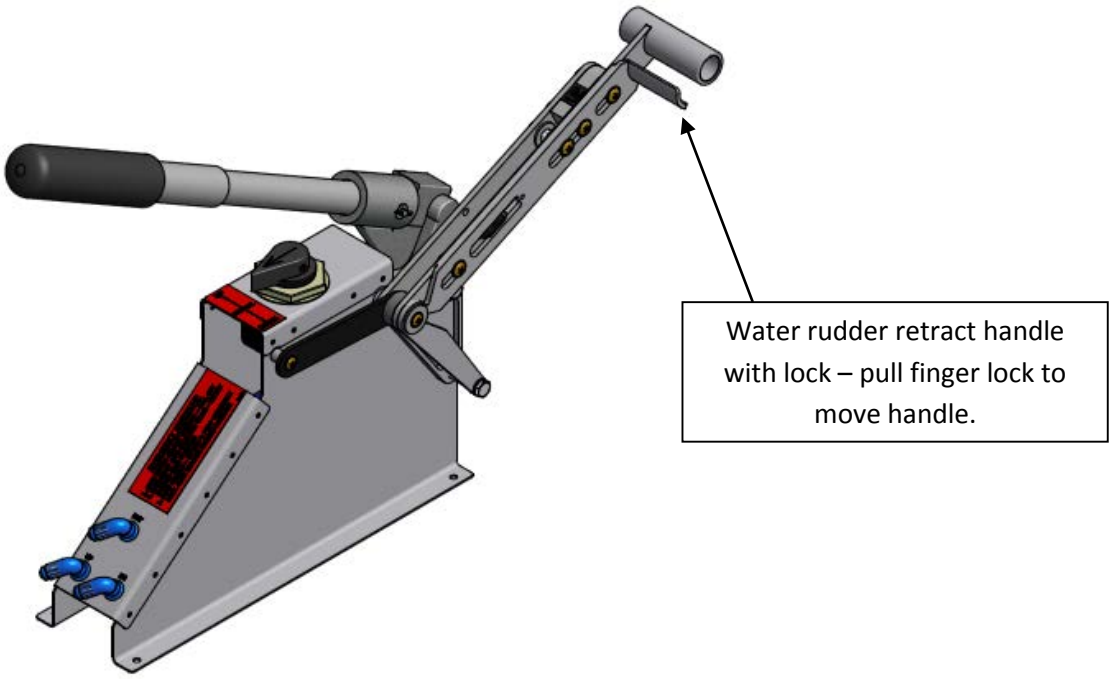
CHAPTER 6
WATER RUDDER

6.0 BASIC DESCRIPTION



Water rudder retract and hand pump, mounted to cockpit floor

The water rudder-retract system is manually operated by a lever through a system of cables and pulleys. A lever in the cockpit controls the position of the rudders. The lever has a locking feature that prevents inadvertent operation of the rudders in flight.

Steering is directed from the aircraft rudder steering system. The controls are interconnected and seamless to the operator. The water rudder moves with the air rudder.

WATER RUDDER RIGGING

All cables in the water rudder steering system should be rigged to 30 +/- 5 lbs. Retraction cables should be rigged such that the top of the rudder blade is approx. 1 inch from the rudder stop on the rudder post in the up position and that the cables are just slack in the down position.

Water rudders should be centered, when the air rudder is centered, by adjusting turnbuckles. There is no left or right rigging adjustment related to the maximum travel of the water rudder system. For 208 cable routing see figure 6-2 or installation drawing 1006006, revision A or later approved revision. For 208B cable routing see figure 6-3 or installation drawing number 1006015 Rev A or later approved.

SEE INSTALL DRAWING # 1006006
REV A OR LATER APPROVED REVISION

FIGURE 6-2: WATER RUDDER/STEERING CABLE ROUTING, MODEL 208

SEE INSTALL DRAWING # 1006015
REV A OR LATER APPROVED REVISION

FIGURE 6-3: WATER RUDDER/STEERING CABLE ROUTING, MODEL 208B

CHAPTER 7
ELECTRICAL

7.0 ELECTRICAL SYSTEM

WET HANDLE VS. DRY HANDLE SYSTEM

These instructions are for the later model (current production) “dry handle” electrical system that is used for new 8750 float installations. For legacy installations retrofitted from 8000’s to 8750s, the “wet handle” system may be installed.

The dry handle system is characterized by a gear selector head containing an electrical switch connected with wires to the aft fuselage mounted pump. The pump direction is reversible. The direction the pump turns is controlled by the gear position switch.

The legacy wet handle system is characterized by a gear selector head that contains a mechanical hydraulic valve and is connected with hydraulic lines directly to the gear. The pump direction is *not* reversible.

For retrofit installations, where the model 8750 is mated to the wet handle equipped aircraft, operation of the hydraulic system is the same as with the model 8000 installation – pressure and return lines at the fuselage exits are connected to pressure and return lines at the strut (pylon) attach points.

The only electrical difference between the legacy 8000 and retrofit 8750 system is the addition of a port and starboard (low) power wire that runs to the powered proximity switch that commands main gear position indication. For Cessna 208 see drawing number 1006012, revision A, or later approved revision, for electrical information pertaining to the retrofit.

For Cessna 208/208B see drawing number 1006011, revision A, or later approved revision, for electrical system descriptive information for the current production dry handle reversible pump installation.

For Cessna 208 wet handle installation, the pump/handle electrical system should be maintained with the ICA pertaining to the model 8000 installation, document P/N 1002554, revision G or later approved revision, with consideration for the two additional power wires shown in drawing 1006012, revision A or later approved revision.

For Cessna 208/208B dry handle installation, the pump/handle electrical systems should be maintained with these ICA. The dry handle

system is installed standard for all new 8750 installations starting May, 2012.

BASIC DESCRIPTION

The following electrical systems are added with the installation of Wipline 8750 floats on the Cessna 208/208B:

1. 24V DC Hydraulic pumps (2), each pump with its own dedicated circuit breaker
2. Gear selector head, for changing pump flow directions to actuate the landing gear up and down, and indicate gear position

For detailed schematic information regarding the electrical system, refer to the previously listed Wipaire, Inc. wiring diagrams.

ELECTRIC HYDRAULIC PUMPS

The installed 24V DC electrically reversing hydraulic pumps are wired independently to allow failure of one pump without affecting the other pump. The pump is electrically shut-off in the up and down directions by a fluid pressure switch that cuts pump power when sufficient hydraulic pressure is obtained in the gear system. Gear swings should take less than 45 seconds with both pumps operating. If the gear cycle time is greater than 45 seconds it is likely that one pump is not pumping efficiently and/or not operating correctly.

This can be verified by pulling each pump breaker to see if the system functions on one pump, but not the other.

GEAR SELECTOR HEAD

The installed gear selector head is similar to units used in several other models of Wipline floats. This selector head switches current directions to the electric pumps, reversing their pumping direction. It also indicates gear positions using four blue and four green incandescent lights. The lights for the nose gear are turned on with a magnetic switch that senses a magnet in the hydraulic cylinder piston. The lights for the main gear position are triggered by inductive proximity switches that are triggered by metal flags on the main gear arm. Lights are a cartridge style and can be replaced by pulling them out from the bezel. A suspected defective light can be quickly replaced with an adjacent light for troubleshooting a suspected defective bulb.

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CHAPTER 8
TKS SYSEM EQUIPPED AIRCRAFT REQUIREMENTS

8.0 TKS SYSTEM BASIC DESCRIPTION

The TKS ice protection system is a system that releases glycol based fluid through laser-drilled panels on the leading edges of the wings, horizontal, vertical stabilizers and other components to prevent ice accumulation. A slinger ring on the propeller also emits fluid to keep the prop, windshield, cargo pod and landing gear free of ice.

TKS SYTEM MODIFICATION WHEN FLOATS INSTALLED

For requirements and guidance on modifying the TKS Icing System on Cessna 208/208B Caravan when 8750 series floats are installed refer to Wipaire installation drawing 1004806 revision A, or later approved revision.

– The TKS fluid pod must be removed and connections capped and covered. For additional control surface movement changes see Wipaire installation drawing 6C1-2023. Control throws are different for the floatplane and TKS equipped landplane. The TKS system is disabled when the floats are installed.

CAUTION

THE CESSNA 208/208B WITH MODEL 8750 FLOATS IS NOT APPROVED FOR FLIGHT IN KNOWN ICING CONDITIONS.

CHAPTER 9
RECOMMENDED PROCESSES, PRODUCTS AND INSP. CHECKLISTS

9.0 SERVICING INSTRUCTIONS

As coded in the Inspection Time Limits chart in this section, there are items to be checked each 25, 50, 100, and 200 hours. Also, there are notes on special items which may require servicing at more frequent intervals.

* When conducting an inspection at 25 hours, all items marked for 25 hours would be accomplished.
    * at 50 hours, the 25 and 50-hour items would be accomplished.
    *at 100 hours, the 25, 50, and 100-hour items would be accomplished.
    * at 200 hours, the 25, 50, 100 and 200-hour items would be accomplished.
    * A complete inspection (Annual Inspection) would include all 25, 50, 100, 200 hour items.

Below is a list of recommended lubricants and "protection" products when servicing float hull and other amphibious components. This lists products used by Wipaire during assembly of the floats.

There may be equivalent products just as satisfactory for protection. However, it is recommended if trying different products, to inspect them frequently so as to determine their effectiveness.

Protection of nuts, bolts, hydraulic lines, metal surfaces, or electrical connections.
Dinitrol AV30
Dinol Group

CRC – SP400 Soft Seal
CRC Industries

General Lubricants
LPS 1, LPS 2 and LPS 3
LPS Industries

Wheel Bearings, Main Gear Retract

Mechanism, Nose Gear Pivot and Rod Ends

*HCF Grease, P/N 605
HCF Industries

*Aeroshell 22
Shell Global Solutions

*Green Grease, Multi-Purpose
Green Grease Inc.

*Aviation Grease SHC 100
ExxonMobil Aviation Lubricants

*** If existing grease cannot be identified you must lubri-flush all float grease fittings until visibly exhausting all old grease and new grease is coming out. Additionally if you cannot determine existing grease in wheel bearings, completely clean and repack bearings with new grease.**

Metal Corrosion Protection
Boeshield T9 Rust Protection
Boeing Company

Corrosion X

ACF-50 Rust Protection

Tef-Gel
Ultra Safety Systems, Inc.

Float Sealant
890 B2 or B4
Pro Seal Company

PR 1440 C
PPG Aerospace

RTV Silicones
General Electric

SIKAFLEX 201 or 252
Sika Manufacturing

Teflon Spray
6P-730A
Comet Industries

Hydraulic Fluid
Mil-H-5606

Electrical Insulating Compound
*Dow Corning 4 (DC4)
Dow Corning Corporation

Bolt Torque
Bolts in Critical Areas - For common, correct torque when installed, or when visual inspection indicates a need for a torque check.

****Tension Nut**

Nut-Bolt Size	Torque Limits (in-lbs)	
	Min.	Max.
8-36	12	15
10-32	20	25
1/4-28	50	70
5/16-24	100	140
3/8-24	160	190
7/16-20	450	500
1/2-20	480	690
9/16-18	800	1,000
5/8-18	1,100	1,300
3/4-16	2,300	2,500
7/8-14	2,500	3,000
1-14	3,700	4,500
1 1/8-12	5,000	7,000
1 1/4-12	9,000	11,000

****Shear Nut**

Nut-Bolt Size	Torque Limits (in-lbs)	
	Min.	Max.
8-36	7	9
10-32	12	15
1/4-28	30	40
5/16-24	60	85
3/8-24	95	110
7/16-20	270	300
1/2-20	290	410
9/16-18	480	600
5/8-18	600	780
3/4-16	1,300	1,500
7/8-14	1,500	1,800
1-14	2,200	3,300
1 1/8-12	3,000	4,200
1 1/4-12	5,400	6,600

** A Torque of 80% should be used when Tef-Gel is applied to the bolt.

9.1 CORROSION REMOVAL

Corrosion is usually detected visually, which is why Wipaire strongly recommends the previous cleaning and inspection procedures. It can appear as a white or pale green powder, discoloration of the metal surface, or bubbles and blisters under the surface of the paint.

Light corrosion is removed by gentle sanding or chromic acid. Moderate and severe corrosion (blistering, flaking and pitting) can be removed by heavier sanding or grinding.

Reinforcement or replacement of affected areas may be necessary if there is critical loss of strength in parent metal and depends on location and other factors.

Pylon before repair…

Pylon Fully Repaired

After removing the corrosion, restore the area to the original finish, like prime and enamel, or coat the metal with a waterproof grease. CORROSION X, or equivalent, should also be applied to stop corrosion and repel moisture and contaminants.

Corrosion Limits	
Area	Allowable Thickness loss
Bottom skins	30%
Side Skins fwd of Step	30%
Side Skins aft of Step	20%
Top Deck	30%
Machining	0.015”
Struts	0.030”

NOTES:
1. Maximum surface area for skin corrosion, up to to the maximum depth, shall not exceed one (1) square inch and must be separated by at least 14 inches from any other skin corrosion damage.
2. For machined fittings, struts, and pylons, corrosion limits are provided as maximum pitting depths. Corroded surface area for these limits shall not exceed 0.5 square inches, and must be separated by at least 5 inches from any other corrosion damage

FIGURE 8-1: CORROSION LIMITS

9.2 MAINTENANCE CHECKLIST

INSTRUCTIONS / PROCEDURES			HOURLY LIMITS					MECHANIC		INSP
	General	Details	25	50	100	200	Annual	Rt.	Lt.	
General	Wash aircraft and floats with fresh water and inspect surfaces, hardware and strut connections for corrosion.	If the airplane is exposed to salt or polluted water, the chance for corrosion increases dramatically. Daily basic cleaning is essential.	X or more often				X			
	Check installed placards against the AFM/POH Supplement Section 2, and installation drawings.				X		X			
Hulls & Struts	Float Installation:	Float exterior – inspect for damage, wrinkled metal, corrosion, paint loss, etc.		X			X			
		If the floats are installed, remove the center section fairings for access. Strut and attach fittings: clean upper attach fittings and dog bone saddle area, If off aircraft, re-grease bolts and return.			X		X			
		Boarding steps disassemble as needed and grease the step-slide tubes.			X		X			
	Pylon, Inspect pylon structure and attachment to float and aircraft.	Remove forward and aft pylon fairings and open rope access door. Inspect door for security. Inspect overall inboard and outboard skins and fairings for damage or corrosion. Inspect pylon and drag brace structure for corrosion or deformation. Inspect all attaching hardware for security, damage, and corrosion. Apply ACF 50 to Pylon Float Deck attach point hardware prior to reinstallation.					X			
	Disassemble and grease the flying wire clevis bolts/pins.	Spreader Bars: inspect for loose screws and cracks.					X			
		On the aircraft and floats: re-coat exposed hardware with suitable coating for corrosion per section 9.0 Servicing Instructions of this manual.			X		X			
Float Interior	Float Structure (Interior):	Closely inspect for wrinkled metal & cracked flanges.			X		X			
	Baggage compartment covers and seals: inspect for condition, security, operation, excessive wear, and corrosion under nut-plates.	After inspection, coat latch mechanism with suitable anti-corrosion grease to protect per section 9.0 Servicing Instructions of this manual.			X		X			
	Pumper Tube Installation: inspect for condition, security, and routing of hoses.					X	X			

INSTRUCTIONS / PROCEDURES			HOURLY LIMITS					MECHANIC		INSP
	General	Details	25	50	100	200	Annual	Rt.	Lt.	
Water Rudder System & Tail	Water rudder blades – inspect condition.	Water rudder blades and posts – inspect for damage, security of attachment, corrosion, paint, rigging. Check post bolts and bushings and lube with LPS 2.	X				X			
	Water rudder steering and retract systems – inspect the following: cables for broken wire; fittings for cable slippage, cracks and distortion; cable pulleys for freedom of rotation and cable guard pins for presence; rigging.	Check top and bottom rollers for rotation and lube with LPS 2 or similar product. Tension cables 30 lbs. +/- 5lbs.		X			X			
	Remove, clean, inspect, and grease the Aux. finlets on the horizontal stabilizer.	All hardware should be coated with suitable corrosion prevention compound per section 9.0 Servicing Instructions of this manual					X			
Electrical System	Pump and indicator light wiring – inspect for chafing, broken, or loose terminals and general condition.				X		X			
	Pressure Switches – inspect wiring, mounting, and general condition				X		X			
	Pump Motors – inspect wiring, mounting, and general condition.				X		X			
Landing Gear Systems	Inspection and servicing nose gear tracks:	Nose tracks and blocks – clean and dry or clean and wipe with silicone spray.	X				X			
	Nose Gear Box/Block Tracks measured at slide route for wear. .050" or less wear tolerance.	Check side play – 3/32" to 1/8" max tolerance.				X	X			

INSTRUCTIONS / PROCEDURES			HOURLY LIMITS					MECHANIC		INSP
	General	Details	25	50	100	200	Annual	Rt.	Lt.	
	Nose gear pivot blocks and forks – inspect for condition, lubrication, corrosion, and paint.		X				X			
	Nose & Main wheel bearings – Grease Zerks.		X				X			
	Inspect Hydraulic rotary actuator in the main wheel well.		X				X			
	Hydraulic fluid level : MIL -H-5606	Check fluid level indication on tanks; Fill as needed	X				X			
	Wheels and tires – inspect for wear, pressure, and condition.	Main Wheels: 60 psi +/- 5 psi. Nose Wheels: 60 psi +/- 5 psi.		X			X			
	Brake assemblies – inspect for wear, corrosion, and leakage.			X			X			
	Hydraulic fluid in reservoir should be checked for moisture or other contaminates and changed if necessary.	When the plastic reservoir is removed, the visible screens should be inspected and cleaned before reassembly.					X			
	Main and Nose gear actuators, Assemblies – inspect for condition, lubrication, leakage, corrosion, and cleanliness.				X		X			
	Nose gear springs – scotch ply springs, inspect for cracks, delamination and paint.				X		X			
	Main gear drag link bushings – inspect for condition, lubrication, and corrosion.				X		X			
	Clean the wheel wells to facilitate general condition inspection.				X		X			
	Main gear oleos – inspect for evidence of leakage, proper extension, and check cylinder for corrosion, pitting, cleanliness, and security.				X		X			
	Hydraulic lines and fittings – inspect for leaks, condition, and security.					X	X			
	Brake system plumbing – inspect for leakage, condition, and security.					X	X			

INSTRUCTIONS / PROCEDURES		HOURLY LIMITS					MECHANIC		INSP
General	Details	25	50	100	200	Annual	Rt.	Lt.	
Main gear oleos – Check for static compression, leaks and proper pressure. The oleo should be fully serviced, replaced, or overhauled as required at annual inspection.	If full servicing is required, use 5606 hydraulic fluid & Nitrogen Cylinder. Cylinder PSI 400-450 Cylinder Capacity 975 +/- 20mL			X		X			
Perform retraction tests as follows:					X	X			
1. Hoist aircraft and place on stands.									
2. Turn on Aircraft Master switch.									
3. Select Gear 'UP' position using selector.	Inspect main gear up and down linkage for proper engagement.								
4. Verify gear lights indicate gear positions correctly while gear is in transit and at the end of travel.	Inspect nose gear trolley for proper travel.								
5. Select Gear 'DOWN' position using selector.									
6. Verify gear lights indicate gear positions correctly while gear is in transit and at the end of travel.	Inspect nose gear for excessive play in the down position.								
Perform Emergency Gear Retractions/Extension tests as follows:					X	X			
1. Pull gear pump circuit breakers (2)									
2. Select desired gear position using Emergency Selector Valve.									
3. Extend emergency hand pump handle and pump vertically until force increases noticeably (150+ strokes).									
4. Verify gear lights indicate gear positions correctly while gear is in transit and at the end of travel.									
5. Repeat in opposite direction.									
Nose and Main wheel bearings – disassemble and inspect	Re-grease bearings with suitable water resistant grease per section 9.0 servicing Instructions of this manual.			X		X			

9.3 FLOAT REMOVAL AND RE-INSTALLATION GUIDE

FLOAT REMOVAL INSTRUCTIONS / PROCEDURES	MECHANIC		INSP.
THIS IS INTENDED AS A GENERAL GUIDE. EACH INSTALLATION MAY HAVE SUBTLE DIFFERENCES. ALWAYS USE THE INSTALLATION DRAWINGS AS THE FINAL REFERENCE. ALL WORK SHOULD BE DONE BY CERTIFIED AIRCRAFT TECHNICIANS.	**Rt.**	**Lt.**	
1. Connect the lifting bar to the hoist and position aircraft underneath			
2. Remove wing gap strips			
3. Inspect aircraft lifting rings for proper assembly and installation before connecting the lifting bar to the aircraft			
4. Attach ropes and ballast to tie-down rings as required to keep aircraft level while lifting			
5. Lower aircraft so wheels just touch and relieve hydraulic pressure before Pulling pump circuit breakers. Install tie-wrap to shank for safety			
6. Remove the following items from aircraft :			
Nose gear cover plate.			
Lower nose cowlings.			
Steering bungee from nose gear attach point.			
Front flying wire fitting.			
Strut fairings and belly plate.			
Tail hatch cover & tail cone (if needed).			
Rear cargo struts and step assembly.			
Auxiliary fins (cover holes with cover plates)			
Nuts from top bolts in forward struts.			
Bolts from front step struts.			
Cotter pins from pulley brackets under cargo door.			
Aft cabin bulkhead and cabin seats as required.			
Floor cover plates for access to steering cables.			
Fairleads from under the cabin floor.			
Elevator down-spring and cable.			
Hydraulic lines at the Main Gear Box location and cap.			
Re-mark Airspeed Indicator as needed per print			

FLOAT REMOVAL INSTRUCTIONS/PROCEDURES (CONT.)	MECHANIC		INSP.
THIS IS INTENDED AS A GENERAL GUIDE. EACH INSTALLATION MAY HAVE SUBTLE DIFFERENCES. ALWAYS USE THE INSTALLATION DRAWINGS AS THE FINAL REFERENCE. ALL WORK SHOULD BE DONE BY CERTIFIED AIRCRAFT TECHNICIANS.	**Rt.**	**Lt.**	
(Remove the following items from aircraft continued)			
Retract cable (Secure in main gear well).			
Break lines and cap.			
Electrical cannon plug in main wheel well.			
Steering cables in tail. Remove rudder horn or clamp to main rudder cables.			
7. Assemble main gear if needed.			
8. Install nose gear and attach steering bungee.			
9. Assemble support crew, minimum six (6) crew members.			
10. With wheels just touching the ground, remove the 4 main gear saddles and upper front attach bolts.			
11. Lift aircraft and remove floats.			
12. Lower aircraft positioning main gear assembly for installation.			
13. Torque main gear saddle bolts to 75 ft. lbs.			
14. Connect brake lines and bleed for air bubbles.			
15. Install main gear belly plate and fairings.			
16. Remove front strut fittings.			
17. Install pilot and co-pilot step assemblies.			
18. Replace Passenger Door Cable Assy. (2) P/N S2837-2 with original Cable Assy. (2) P/N S2837-1			
19. Install tail cone and tail hatch cover.			
20. Install lower LT. cowling.			
21. Install all nose gear fittings.			
22. Install all floor plates and carpet.			
23. Install aft bulkhead.			
24. Install any seats previously removed.			

FLOAT REMOVAL INSTRUCTIONS/PROCEDURES (CONT.)	MECHANIC		INSP.
	Rt.	Lt.	
THIS IS INTENDED AS A GENERAL GUIDE. EACH INSTALLATION MAY HAVE SUBTLE DIFFERENCES. ALWAYS USE THE INSTALLATION DRAWINGS AS THE FINAL REFERENCE. ALL WORK SHOULD BE DONE BY CERTIFIED AIRCRAFT TECHNICIANS			
(Remove the following items from aircraft continued)			
25. Remove aircraft from hoist and add air to tires as required.			
26. Install wing-root fairings.			
27. Check all placards to conform to landplane category.			
28. Make logbook entry.			
NOTES:			

FLOAT RE-INSTALL INSTRUCTIONS/PROCEDURES	MECHANIC		INSP.
THIS IS INTENDED AS A GENERAL GUIDE. EACH INSTALLATION MAY HAVE SUBTLE DIFFERENCES. ALWAYS USE THE INSTALLATION DRAWINGS AS THE FINAL REFERENCE. ALL WORK SHOULD BE DONE BY CERTIFIED AIRCRAFT TECHNICIANS.	**Rt.**	**Lt.**	
1. Remove the nose and main gear fairings and the belly plate.			
2. Remove wing gap strips and the tail cover.			
3. Install the finlets and seal.			
4. Remove aft panel inspection covers for Hydraulic pump access and cables.			
5. Remove pilot and Co-pilot steps.			
6. Replace Passenger Door Cable Assy. (2) P/N S2837-1 with Cargo Door Cable Assy. (2) P/N S2837-2			
7. Install front strut fittings.			
8. Disconnect brake lines and cap.			
9. Cut Tie-wrap from pump circuit breakers.			
10. Tie ropes from tie-down rings. Connect lifting bar to hoist and inspect aircraft lifting rings for proper assembly before connecting to aircraft. Use ballast from tie-down to ensure level lifting.			
11. Raise aircraft until wheels are just touching the ground and assemble.			
12. Assemble support crew, minimum six (6) crew members.			
13. Remove saddles holding main gear in place. With crew support crew stabilizing aircraft, hoist aircraft clear of main gear and roll away from aircraft.			
14. Lube saddles on aircraft and saddle bolts and position floats under aircraft.			
15. Lower aircraft to floats, install front struts first then lower aircraft onto Saddles and install clamps.			
16. Torque the saddle bolts to 75ft/lbs.			
17. Remove the Nose gear.			
18. Install the flying wire fitting. Install flying wires, rig with regard to airflow.			
19. Secure the steering bungee and connect the hydraulic lines.			
20. Locate jack stands under floats.			

FLOAT RE-INSTALL INSTRUCTIONS/PROCEDURES (CONT.)	MECHANIC		INSP.
THIS IS INTENDED AS A GENERAL GUIDE. EACH INSTALLATION MAY HAVE SUBTLE DIFFERENCES. ALWAYS USE THE INSTALLATION DRAWINGS AS THE FINAL REFERENCE. ALL WORK SHOULD BE DONE BY CERTIFIED AIRCRAFT TECHNICIANS.	**Rt.**	**Lt.**	
(Re-Install from aircraft continued)			
21. Perform gear check and ensure all lights agree with gear position and gear advisory.			
22. Cycle time up? Cycle time down? Check for leakage			
23. Hand pump the gear down and up and check for leakage.			
24. Install springs for steering cables in the tail of the aircraft.			
25. Route and rig the steering cables and water rudder retract cables with 30lbs. +/- 5lbs.			
26. Install step struts.			
27. Install brake lines and bleed for air bubbles (See Chapter 5 section 5.1 this manual).			
28. Install elevator down-spring.			
29. Install belly plate and fairings for main gear.			
30. Install tail inspection cover, cowling, and wing gap strips.			
31. Inflate tires IAW Chapter 1 Figure 1-8 of this manual.			
32. Remove aircraft from stands, check for proper main oleo extension (see Section 4)			
33. Check aircraft placards against the flight manual supplement or install drawings for accuracy.			
34. Plug nose leg fairing holes, pilot, and Co-pilot step holes.			
35. Make logbook entry.			
NOTES:			

9.4: WEIGHING PROCEDURES FOR CESSNA 208/208B, CARAVAN

Level aircraft per manufacturer's instructions or use the cabin door lower sill.

Place scales under the right and left main and nose gears.
Place blocking under the right and left main gears to level aircraft.

Draw lines on the floor from the centerline main wheels and centerline nose wheel left to right.

Drop a plumb bob from the face of the firewall. This is station 100.00. Measure 100.00 inches forward of this point, this is the datum, 0.0.

Draw another line between the nose wheel centers and a 4th line between the main wheel centers.
Measure the distance from 0.0 to the nose wheel line. This is X_1 and X_2.
Measure the distance from 0.0 to the main wheel line. This is Y_1 and Y_2.

If the floats are seaplane floats, the scales go under the step point in the rear and a point towards the front of the float. These distances are measured and become the same X and Y as for the amphibian.

Scale Reading Distance from 0.0 Weight x Arm

	Weight	**x**	**Arm**	**=**	**Moment**
Left Front	+		+ X_1		+
Right Front	+		+ X_2		+
Left Rear	+		+ Y_1		+
Right Rear	+		+ Y_2		+

Totals

Notes:

1. Zero out or deduct tare weights at the Y arm.

CHAPTER 10
TROUBLESHOOTING

Malfunction	Potential Cause(s)	Corrective Action
Power pack does not run after gear selection.	a. Circuit breaker is open (triggered).	a. Reset circuit breaker
	b. Pressure switch is not actuating at the low	b. Jump across pressure switch leads to determine if
	pressure trip point.	motor runs. If motor operates replace the solenoid
		switch.
	c. Solenoid switch not actuating.	c. Jump across solenoid leads and determine if motor
		runs. If motor operates replace solenoid pressure
		Switch.
	d. Faulty ground on pump.	d. Correct motor ground.
	e. Faulty pump motor.	e. Replace faulty pump motor.
Power pack doe not shut down after gear reached desired	a. Faulty pressure switch.	a. Replace pressure switch.
position.	b. Faulty or dirty pressure relief valve	b. Clean or replace relief valve as required.
	allowing insufficient pressure to satisfy switch.	
Power pack shuts off before gear reaches desired	a. Binding or jammed gear actuator.	a. Repair gear actuator.
position.	b. Faulty pressure relief valve.	b. Replace faulty pressure relief valve.
Power pack cycles on and off after gear is in position.	a. External hydraulic leak.	a. Visually inspect lines, actuators and hoses and
	b. Internal hydraulic leak.	replace as required.
		b. Disconnect and cap off on actuator at a time and
		isolate the internally leaking actuator by process of
		elimination. If all the actuators have been isolates and
		the pump cycling continues, replace the power pack
		check valve.
Power pack cycles on and off during gear cycle.	a. Binding in the retraction unit.	a. Inspect for free operation of the retraction unit.
		Suspect the gear that retracts last.
	b. Pressure switch cut off limit too low.	b. Replace pressure switch.
Slow gear retraction (considerably longer than 30 seconds).	a. Plugged oil screen.	a. Clean intake screen located inside reservoir tank.
	b. Poor electrical connection to motor.	b. Connect a 24 VDC power source directly to the pump.
		If pump operation improves correct wiring.
	c. Poor motor.	c. Replace pump motor.
	d. Worn pump gears.	d. Replace pump.
Circuit breaker pops during cycle.	a. Defective or corroded wire connections.	a. Correct wiring and protect terminals with grease.
	b. Defective motor brushes.	b. Replace pump motor.
	c. Defective circuit breaker.	c. Replace circuit breaker.
Landing gear position indicators do not test.	a. Landing gear indication circuit breaker tripped.	a. Reset circuit breaker.
	b. Annunciator test switch defective.	b. Replace annunciator test switch.

Malfunction	Potential Cause(s)	Corrective Action
Individual landing gear position indicator does not test	a. Defective bulb	a. Replace defective bulb.
Individual landing gear position indicator illuminates during test But does not show correct gear position	a. Gear out of position and not contacting gear position switch	a. Using extreme caution inspect affected gear to determine that the gear is fully in the selected position. Correct gear actuation condition.
	b. Defective gear position switch.	b. Replace defective gear position switch.
Aircraft leans to one side on amphibian gear.	a. Fuel has migrated from one wing to the other causing a fuel imbalance.	a. Check fuel level in both wings for correct fuel balance and transfer fuel as necessary to bring fuel into balance.
	b. Tires not inflated properly.	b. Inflate tires to correct pressures
	c. Oleo strut may be underserviced.	c. Service strut as required.
	d. Damaged gear parts or bent axle.	d. Inspect gear for loose or damaged parts including a bent axle and repair as required
Tires wear excessively – main gear	a. Tires not inflated to proper pressures.	a. Inflate tires to correct pressures.
	b. Main gear trucks out of alignment.	b. Align left and right float using horizontal cross wires.
	c. Landing gear has loose or worn components.	c. Replace or adjust landing gear components.
	d. Axle is bent	d. Replace landing gear lower link.
	e. Brakes dragging.	e. Inspect and repair brake components to preclude brake drag.
	f. Wheel/tires out of balance.	f. Balance wheels/tires as required.
Tires wear excessively – nose gear	a. Tires not inflated to proper pressures.	a. Inflate tires to correct pressures.
	b. Landing gear has loose or worn components.	b. Replace or adjust landing gear components.
	c. Axle is bent	c. Replace landing gear lower link.
	d. Wheel/tires out of balance.	d. Balance wheels/tires as required.
Wheel and tire vibration	a. Wheel/tire out of balance	a. Balance wheels and tires.
Nose wheel shimmies	a. Loose or worn nose gear components.	a. Inspect nose gear components for condition and wear. adjust or replace components as required.
	b. Nose wheel/tires out of balance.	b. Balance nose wheel/tire
Brakes drag	a. Binding brake pedals.	a. Lubricate the brake pedal pivot points or repair/replace defective parts.
	b. Broken brake piston return spring.	b. Repair or replace brake master cylinder.
	c. improperly rigged parking brake control.	c. Re-rig parking brake control.
	d. Restriction in brake hydraulic lines.	d. Remove restriction form lines, flush system and reservoir with clean hydraulic fluid.
	e. Warped or scored brake disk.	e. Replace disc and linings.
	f. Brake damage or accumulated dirt and grim restricting movement.	f. Clean or replace components as required.

Malfunction	Potential Cause(s)	Corrective Action
Brakes fail to operate	a. Improper brake hydraulic fluid level.	a. Service brake hydraulic reservoir.
	b. Worn brake linings.	b. Replace brake linings.
	c. Defective O-ring in master or brake cylinder.	c. Replace defective O-ring.
	d. Internal damage due to incorrect type of brake fluid	d. Replace or rebuild defective components, flush system,
	In system.	Refill system with MIL-H-5606, and bleed the brakes.
Brakes feel spongy.	a. Air in brake system.	a. Bleed brakes.
	b. Swollen or defective hoses.	b. Replace defective hoses.
	c. Improper brake hydraulic fluid level.	c. Service brake hydraulic reservoir.
Water rudders fail to retract and extend normally.	a. Water rudder cable system out of rig or binding.	a. Inspect water rudder cable system for condition and
		rigging. Correct as required.
Water rudders fail to retract to the same height	a. Water rudder retract cable system out of rig.	a. Rig water rudder cable system.
	b. Broken or mis-adjusted water rudder up stop.	b. Replace and adjust water rudder up stops.
Water rudders fail to operate.	a. Water rudder system cable broken.	a. Replace defective water rudder cable.
	b. Water rudder cable system out of rig.	b. Rig water rudder cable system.

CHAPTER 11
INSTALLATION PRINT INFORMATION

WIPAIRE DRAWINGS REQUIRED FOR 8750 FLOAT INSTALLATION

CESSNA 208 CARAVAN

See Wipaire drawing 1006000, revision A or latest approved revision, for a complete list of drawings pertaining to the installation and removal of the 8750 floats. A copy of this drawing and all drawings listed thereon can be obtained from Wipaire, Inc. These drawings are necessary to properly maintain the aircraft.

WIPAIRE DRAWINGS REQUIRED FOR 8750 FLOAT INSTALLATION

CESSNA 208B CARAVAN

See Wipaire drawing 1006001, revision A or latest approved revision, for a complete list of drawings pertaining to the installation and removal of the 8750 floats. A copy of this drawing and all drawings listed thereon can be obtained from Wipaire, Inc. These drawings are necessary to properly maintain the aircraft.

CHAPTER 12
AIRCRAFT INSTALLED PERFORMANCE ITEMS AND DECRIPTIONS

12.1 WING FENCES GENERAL DESCRIPTION

Wing fences are flat plates fixed to control surfaces on top of the wing. The Cessna 208 comes standard with one fence attached to the inboard edge of each aileron. As part of the float installation on the Cessna 208B, four fences are installed: one of the inboard edge of each aileron and one on the inboard edge of each spoiler. The fences are installed to aid in lateral stability and stall characteristics. All of the appropriate fences must be in place prior to flight. For location and installation of Wing fences on the Cessna 208B, see Wipaire drawing number 1006698 Rev. A or later approved revision.

12.2 VORTEX GENERATORS GENERAL DESCRIPTION

The Vortex Generators are typically a triangular shape design made of various materials that are used to energize airflow over control surfaces or wings. There are typically ten (10) equally spaced Vortex Generators on each upper wing just aft of the leading edge on the Cessna 208B only. Cessna 208B aircraft previously equipped with a TKS fairing have roughly 34 Vortex Generators installed. With the addition of the Vortex Generators the aircraft will have improved controllability and safety at low speeds. No more than two non-adjacent vortex generators per wing can be missing at any one time. If a Vortex Generator is missing, replace as soon as possible. Refer to Cessna 208 models Configuration Deviation List.

12.3 FLOAT SUCTION BREAKERS GENERAL DESCRIPTION

The suction breakers are angled aluminum channel riveted to the bottom surface of the float afterbody. There are four suction breakers installed on each float afterbody, two inboard and two outboard. The suction breakers are installed to decrease a tendency for the afterbody to stay attached to the water on takeoff, particularly on glassy water conditions. Any number of suction breakers can be missing, but must be reinstalled as soon as possible. For installation and location of Suctions breakers see Wipaire drawing number 1006575 Rev. A or later approved revision.

CAUTION!

Missing suction breakers will result in longer water takeoff runs, particularly in glassy water.

WARNING!

If suction breakers are found to be missing ensure that holes are adequately sealed prior to any further water operation to prevent float compartment filling with water.